

CARLETON UNIVERSITY



1961-1962 CALENDAR

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1961/62

FACULTY OF ARTS AND SCIENCE
SCHOOL OF PUBLIC ADMINISTRATION
SCHOOL OF ENGINEERING
DAY AND EVENING DIVISIONS



HOW TO REGISTER

- New full-time students enrolling for a degree, diploma, or certificate will take all of these steps.
 - New part-time students enrolling for a degree, diploma, or certificate will take steps 1, 2 and 5.
 - Returning full-time students will take steps 4 and 5.
 - All other students, including returning part-time undergraduates and graduate students, and part-time students not enrolling for a degree, diploma, or certificate, take step 5 only.
1. Complete application for admission on form available from the Registrar's Office. Applications should be submitted to the Registrar well in advance of term opening.
 2. Attach certificates of former schooling (Junior Matriculation and any studies pursued subsequently) to application for admission, or arrange for them to be sent to the Registrar.
 3. When application has been approved, (a) arrange for physical examination by own physician and (b) have him report results to the University on the Personal Health Record form available from the Registrar's Office. This report must be completed and submitted to the University before final registration.
 4. Prior to fall registration *each year*, submit evidence of having had a chest X-ray within six months prior to the opening of classes. This may be arranged, free of charge, at the May Court Clinic, 374 Besserer Street, Ottawa, any time after May 1. (Carleton students may be examined, except in July, on Tuesday, Wednesday, or Thursday, 2 to 4 p.m.) If examined elsewhere, furnish evidence of a negative report: (See also p. 26.)
 5. During the appropriate registration period specified under The Academic Year (p. 5), come to the University to (a) arrange final selection of subjects, (b) complete registration forms, (c) pay fees, (d) receive class and library admission cards, and (e) complete required aptitude tests (if new full-time students.)
 6. Full-time students enrolling for the first time are to report to the University, Monday morning, September 11, at 9 o'clock.
- The attention of all students is drawn to the additional fees required of late registrants, where late registration is permitted. (See p. 30.)
 - University office and library hours are listed inside the back cover.

As this Calendar is published several weeks before the opening of the session, the University reserves the right to make whatever changes circumstances may require, including cancellation of particular courses.

CARLETON UNIVERSITY

**Twentieth Annual Calendar
Day and Evening Divisions
for the academic year 1961 - 1962**

**Rideau River Campus
Colonel By Drive
Ottawa 1**

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THE ACADEMIC YEAR

Summer Session

1961

- May 24, 25 Registration for summer session (7 to 9 p.m.).
 May 29 Summer session classes begin.
 July 15 Last day for applications for supplemental examinations.
 Aug. 7 Civic Holiday. No classes.*
 Aug. 17 Last day of summer session classes.
 Aug. 21, 22 Summer session examinations.
 *Classes will meet instead on the following day.

Winter Session

- Sept. 4 Labour Day. University closed.
 Sept. 5-9 Supplemental examinations.
 Sept. 12-15 **Registration for classes in day and evening divisions:**

- | | | |
|--|------------------|-------------------------------------|
| Tuesday, Sept. 12 | 2-4 and 7-9 p.m. | Registration of new students. |
| Wednesday, Sept. 13 | 2-4 and 7-9 p.m. | Registration of new students. |
| Thursday, Sept. 14 | 2-4 and 7-9 p.m. | Registration of returning students. |
| Friday, Sept. 15 | 2-4 and 7-9 p.m. | Registration of returning students. |
| Tuesday, Sept. 12-
Friday, Sept. 15 | } | Registration of evening students. |
| Monday, Sept. 25-
Friday, Sept. 29
(afternoons, 2-4) | | Registration of graduate students. |

- Sept. 18 Classes begin in all courses, day and evening.
 Oct. 2 { Last day for late registration.
 Oct. 9 { Last day for change from one course to another.
 Oct. 14 { Thanksgiving Day. No classes.
 Nov. 18 Last day for applications for summer session supplemental examinations.
 Dec. 13 Summer Session supplemental examinations.
 Dec. 14-21 Last day of classes in the first term, day and evening divisions.
 Dec. 14-21 Mid-year examinations. (See also Jan. 3-6).

1962

- Jan. 3-6 Final examinations in first term half courses, and remaining mid-year examinations.
 Jan. 8 Second term begins in day and evening divisions.
 Feb. 15 Last day for formal withdrawal from courses.
 Feb. 23-25 Mid-term break. (No classes).
 April 16 Last day of classes in the second term, day and evening divisions.
 April 25 - May 8 Final examinations in day and evening divisions.
 May 8 Last day for handing in of term assignments.
 May 25 Convocation for the conferring of degrees.

HISTORICAL STATEMENT

The Ottawa Association for the Advancement of Learning, later to become Carleton College and finally Carleton University, was established in the summer of 1942, and opened its first classes on September 21, in that year. In the first three years, teaching was done in evening classes only, in rented premises, and by part-time instructors. Instruction was given in the subjects of Grade XIII (Ontario) and first year university, with a few courses in the elements of public administration.

On March 19, 1945, day classes in matriculation courses were opened for the benefit of war veterans. In the following years, as the number of veterans diminished, civilian students were admitted to day classes.

In September, 1945, courses in Journalism and in the first year of Engineering were added to those already provided in Arts, Science, and Commerce, and all these programs were consolidated in a Faculty of Arts and Science.

The first degrees of the University, three Bachelor of Journalism and three Bachelor of Public Administration, were conferred on October 23, 1946.

On February 6, 1947, the University sustained a severe blow in the loss by death of Henry Marshall Tory, D.Sc., LL.D., D.C.L., F.R.S.C., first President of Carleton University and the leader more responsible than any other for the success attained by the University in the first five years of its existence. On February 18, 1947, Murdoch Maxwell MacOdrum, M.A., Ph.D., Vice-President of the University, was appointed by the Board of Governors to succeed Dr. Tory as President.

Upon Dr. MacOdrum's death on August 1, 1955, following eight years of outstanding leadership, the Board of Governors appointed James Alexander Gibson, M.A., D.Phil., Dean of the Faculty of Arts and Science, as Acting President of the College.

On January 31, 1956, Claude Thomas Bissell, M.A., Ph.D., F.R.S.C., Vice-President of the University of Toronto, was appointed President, taking office on July 1, 1956, and serving until June 30, 1958.

On July 4, 1958 Arnold Davidson Dunton, D.Sc., LL.D., was appointed by the Board of Governors to succeed Dr. Bissell as President.

In the summer of 1947 the University announced its plans for the organization of complete four-year Courses and five-year Honours Courses leading to the degrees of Bachelor of Arts, Bachelor of Science, and Bachelor of Commerce. The third year in all these courses was made available to students of the University in September, 1947, the fourth year in September, 1948, and the fifth year of certain Honours Courses in September, 1949. The first degrees in Arts, Science and Commerce were conferred in May 1949, and the first Honours degrees in May 1950. A program of studies leading to a Graduate Diploma in Public Administration was introduced in 1952. A School of Public Administration was established in 1953 and in the following year candidates were accepted for the M.A. degree in that field. The first M.A. degree was conferred in May, 1955.

By May 1961 the University had conferred 1,493 Bachelor's degrees. On February 26, 1954, it conferred its first honorary degree of LL.D. on Dag

Hammaraskjold, Secretary-General of the United Nations; on May 21, 1954, the second on Sir Douglas Copland, High Commissioner for Australia in Canada; and on May 18, 1956, the third on Hugh Llewellyn Keenleyside, Director-General, Technical Assistance Administration, United Nations.

On May 17, 1957, to commemorate the organization of The Canada Council, honorary degrees were conferred upon Professor H. Northrop Frye, Chairman of the Department of English in Victoria College in the University of Toronto, and A. Y. Jackson, Canadian artist.

Recipients in 1958 were Professor J. W. T. Spinks, Professor of Chemistry and Dean of Graduate Studies, University of Saskatchewan, and Professor J. Tuzo Wilson, Department of Geophysics, University of Toronto.

In 1959 the recipients were Senator Norman McL. Paterson, Professor F. H. Underhill, and Very Rev. Henri Légaré, Rector of the University of Ottawa; in 1960 Dr. Claude T. Bissell, F.R.S.C., President of the University of Toronto, George G. Croskery, Executive Secretary of the Canadian Teachers' Federation, Yousuf Karsh, and Alice E. Wilson, F.R.S.C., for many years a member of the Geological Survey of Canada, were similarly honoured.

On November 23, 1954, Dr. C. J. Mackenzie was installed as second Chancellor of the University, succeeding Dr. H. S. Southam, who had served as first Chancellor from June 19, 1952 until his death on March 27, 1954.

The first full-time teaching appointments in the ranks of lecturer, assistant professor, associate professor, and professor became effective on September 1, 1947. These appointments, and all subsequent appointments to the teaching staff, have carried from the beginning the appropriate privileges of professional tenure.

As of June 19, 1943, The Ottawa Association for the Advancement of Learning became an incorporated body by Letters Patent. In order that the power to grant degrees should be specifically recited, application to the Legislature of the Province of Ontario for this and other academic powers and to change the name, resulted in the Carleton College Act, 1952, whereby the institution became Carleton College, endowed with university powers, and with "authority to grant in all branches of learning any and all university degrees and honorary degrees, and diplomas", and "power to establish and maintain such faculties, schools, institutes, departments, chairs and courses of instruction as shall be deemed meet by the Board". A further application to the Legislature of the Province of Ontario, resulted in the Carleton University Act, 1957, changing the name to Carleton University.

On June 11, 1952, the University was made a member of the National Conference of Canadian Universities, and on February 26, 1953, a member of the Association of Universities of the British Commonwealth.

The University is non-sectarian and co-educational. Its conduct and management is vested in a Board of Governors.

Enrolment in the winter session 1960-61 in day and evening divisions, included 1157 full-time students and 1161 part-time students in courses offered for academic credit, and 725 registered in non-credit extension courses; a total of 3043.

CHANCELLOR

CHALMERS JACK MACKENZIE, C.M.G., M.C., B.E., M.C.E., D.SC.
D.ENG., LL.D., D.C.L., F.R.S., F.R.S.C., M.E.I.C.

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The President and Vice-Chancellor

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Dean of the Faculty of Arts and Science

Professor M. S. MACPHAIL, M.A., D.PHIL., F.R.S.C.,
Associate Dean of the Faculty of Arts and Science

Professor R. OLIVER MACFARLANE, M.A., PH.D.
Director of the School of Public Administration

Professor JOHN RUPTASH, B.SC., M.A.SC., PH.D.
Director of the School of Engineering

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Assistant Professor LAWRENCE M. READ, M.A. (until 1963)

Associate Professor T. N. BREWIS, M.COM., PH.D. (until 1962)

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KEITH N. HARRIS, B.A., B.PH.E. (Queen's)

OFFICERS OF INSTRUCTION

WINTER 1961-62

Professors, Associate Professors, Assistant Professors, Lecturers

Douglas G. Anglin, B.A. (Toronto), M.A., D.PHIL. (Oxford)

Associate Professor of Political Science

J. Norman Austin, B.A. (Toronto), M.A. (California),

Lecturer in Classics

Isabel Law Bayly, B.SC. (Carleton), M.A. (Toronto),

Lecturer in Biology

Alexander Munro Beattie, B.A. (Toronto), A.M., PH.D. (Columbia),

Professor of English

Paul R. Beesack, B.A. (McMaster), A.M., PH.D. (Washington),

Associate Professor of Mathematics

J. E. Blais, L. ès L. (Montreal),

Assistant Professor of French

Desmond G. Bowen, B.A. (Carleton), M.A. (Queen's),

Assistant Professor of History

William H. Bowes, DIP.ENG. (Dalhousie), B.ENG., M.ENG. (Nova Scotia

Tech.), M.SC. (Michigan),

Associate Professor of Engineering

Thomas Newton Brewis, M.COM., PH.D. (Durham),

Associate Professor of Economics

Hyman Burshtyn, M.A. (McGill),

Lecturer in Sociology

E. A. Cherniak, M.A. (Queen's), PH.D. (Leeds),

Assistant Professor of Chemistry

T. James S. Cole, B.SC. (Eng.) (London), B.SC. (Carleton),

PH.D. (Cambridge), A.C.G.I.,

Assistant Professor of Physics

Gordon S. Couse, B.A. (McMaster),

Associate Professor of History (on leave of absence, 1961-62)

M. Nancy Donald, M.A., DIP.EDUC. (New Zealand), PH.D. (Michigan),

Associate Professor of Psychology

Duncan Edmonds, B.A. (Toronto),

Lecturer in Political Science

Wilfrid Eggleston, M.B.E., B.A. (Queen's), F.A.G.S.,

Professor of Journalism (on leave of absence, 1961-62)

H. Edward English, B.A. (British Columbia), PH.D. (California),

Associate Professor of Economics

David M. L. Farr, B.A. (British Columbia), M.A. (Toronto),

D.PHIL. (Oxford),

Professor of History

Charles Paul Fleischauer, A.M., PH.D. (Harvard),

Assistant Professor of French

- Allan Guy Forman, B.A., M.SC. (British Columbia),
Assistant Professor of Chemistry (on leave of absence, 1961-62)
- Jeremy C. Forster, M.A. (Cambridge),
Lecturer in Spanish
- Muni C. Frumhartz, B.A. (Toronto), A.M. (Columbia),
Assistant Professor of Sociology
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Lecturer in Mathematics
- J. G. Garrard, M.A. (Oxford),
Lecturer in Russian
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M.A., B.LITT., D.PHIL. (Oxford),
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Associate Professor of Engineering (on leave of absence, 1961-62)
- H. Scott Gordon, B.A. (Dalhousie), A.M. (Columbia),
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- Malcolm A. Gullen, B.SC. (Edinburgh), M.S. (Purdue),
Associate Professor of Engineering
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Professor of Physics
- Patrick Arthur Hill, B.SC. (London), PH.D. (Columbia), F.G.S., F.P.S.,
F.R.G.S.,
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Associate Professor of Political Science (on leave of absence,
1961-62)
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Assistant Professor of Geography

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Assistant Professor of Journalism
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PH.D. (Wisconsin),
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D.PHIL. (Oxford), F.R.S.C.,
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- Isabel Macquarrie, B.A. (Manitoba), A.M. (Washington),
Lecturer in Mathematics
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M.S.E.E. (Lehigh), PH.D. (Syracuse),
Assistant Professor of Engineering
- Robert L. McDougall, B.A. (British Columbia), M.A., PH.D. (Toronto),
Associate Professor of English
- Bruce A. McFarlane, M.A. (McGill),
Assistant Professor of Sociology
- John Alexander Buchanan McLeish, M.A. (McGill), PH.D. (Cornell),
Research Associate Professor of Education
- Kenneth Douglas McRae, B.A. (Toronto), A.M., PH.D. (Harvard),
Associate Professor of Political Science (on leave of absence,
1961-62)
- Stanley R. Mealing, B.A. (Alberta), M.A., B.LITT. (Oxford),
Associate Professor of History
- Michel Pierre Mélése, D. ès L. (Sorbonne),
Chevalier de la Légion d'Honneur,
Visiting Professor of French
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Associate Professor of Geography

- John S. Moir, M.A., PH.D. (Toronto),
Assistant Professor of History
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Professor of Chemistry
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Professor of Physics
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Professor of Biology
- F. H. Northover, M.A. (Cambridge), PH.D. (London),
Associate Professor of Mathematics
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Associate Professor of German
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Associate Professor of Sociology (on leave of absence, 1961-62)
- R. Putnaerglis, MECH.ENG. (Latvia), M.ENG. (McGill), P.ENG.,
Associate Professor of Engineering
- Lawrence M. Read, B.A. (Dalhousie), M.A. (Toronto),
Assistant Professor of Religion
- John Evans Riddell, B.ENG., M.SC., PH.D. (McGill), F.R.S.C., F.G.S.A., F.G.A.C.,
Professor of Geology
- Donald C. Rowat, B.A. (Toronto), A.M., PH.D. (Columbia),
Professor of Political Science
- John Ruptash, B.SC. (Alberta), M.A.SC., PH.D. (Toronto),
Professor of Engineering
- T. J. Scanlon, B.J., D.P.A. (Carleton), M.A. (Queen's),
Visiting Lecturer in Journalism
- Donald Alan Smith, M.A., PH.D. (Toronto),
Assistant Professor of Biology (Zoology)
- M. K. Sundaresan, M.SC. (Delhi), PH.D. (Cornell),
Assistant Professor of Physics
- F. Ellenor M. Swallow, M.A. (Alberta), PH.D. (Cornell),
Associate Professor of Classics (on leave of absence, 1961-62)
- S. G. Tackaberry, C.B.E., B.A.SC. (Toronto), M.E.I.C.,
Assistant Professor of Engineering
- R. Stephen Talmage, M.A. (Oxford),
Assistant Professor of Philosophy
- James S. Tassie, B.A. (McMaster), M.A., PH.D. (Toronto),
Associate Professor of French
- James M. Thompson, M.A. (Toronto),
Assistant Professor of Philosophy
- Hans Treffner, B.SC. (Sir George Williams),
Lecturer in Mathematics

W. Tupper, M.SC. (New Brunswick), PH.D. (M.I.T.),
 Assistant Professor of Geology
 Karl Van Dalen, B.SC. (Queen's), D.I.C., M.SC. (London),
 Lecturer in Engineering
 Frank Robert Wake, B.A., PH.D. (McGill),
 Associate Professor of Psychology
 Bernard Wand, B.A. (Queen's), M.A., PH.D. (Cornell),
 Associate Professor of Philosophy (on leave of absence, 1961-62)
 Russell Allen Wendt, M.A. (Alberta),
 Associate Professor of Psychology
 James C. S. Wernham, v.A. (Aberdeen and Cambridge), S.T.M. (Union),
 Professor of Philosophy
 Frank Wightman, B.SC., PH.D. (Leeds),
 Associate Professor of Biology (Botany)
 D. R. Wiles, B.SC. (Mount Allison), M.SC. (McMaster), PH.D. (M.I.T.),
 Assistant Professor of Chemistry
 Gordon James Wood, M.A. (Toronto),
 Associate Professor of English
 Whitman Wright, B.A.SC. (Toronto),
 Assistant Professor of Engineering
 William L. Young, M.SC., PH.D. (McGill),
 Assistant Professor of Geology

Sessional Lecturers, Instructors, Demonstrators, and others

Kenneth P. Adler, M.A., PH.D. (Chicago),
 Sessional Lecturer in Sociology*
 F. J. Alcock, B.A. (Toronto), PH.D. (Yale), F.R.S.C., F.G.S.A.,
 Special Lecturer in Geology*
 Marjorie Allen, B.SC. (Columbia), M.SC. (Northwestern),
 Sessional Lecturer in Geology*
 Robert P. Armstrong, B.A. (Carleton),
 Sessional Lecturer in Political Science*
 Francisco Atienza, B.T. (Salamanca), LIC.T. (Innsbruck), LIC.D. (Rome),
 PH.D. (Ottawa),
 Special Lecturer in Spanish
 Frances Oakes Baldwin, B.A. (Saskatchewan), B.J. (Carleton),
 Sessional Lecturer in Journalism*
 John A. Baycroft, M.A. (Cambridge),
 Sessional Lecturer in Religion*
 R. L. Beatty, B.A. (Toronto),
 Sessional Lecturer in Mathematics*
 Simone Bédard, L. en D. (Paris),
 Sessional Lecturer in French*

*Part time

- Dolores Bedingfield, M.A. (Memorial),
Sessional Lecturer in English*
- G. Belkov, M.A. (British Columbia),
Special Lecturer in Russian*
- W. R. N. Blair, M.A. (Alberta), PH.D. (Ottawa),
Sessional Lecturer in Psychology*
- Robert M. Bone, B.A. (British Columbia), M.A. (Washington),
Sessional Lecturer in Geography*
- R. W. Boyle, M.A., PH.D. (Toronto), F.R.S.C.,
Sessional Lecturer in Geology*
- Harold J. Breen, M.A., PH.D. (Western Ontario),
Sessional Lecturer in Psychology*
- C. N. Brennan, B.COM. (British Columbia), M.S. (Columbia), C.A.,
Sessional Lecturer in Accounting*
- N. R. Brining, B.COM., C.A.,
Sessional Lecturer in Accounting*
- J. Bruhwiler, B.A. (Carleton),
Sessional Lecturer in German
- Elizabeth Butterill, B.A. (Western Ontario),
Demonstrator in Physics*
- L. J. Byrne, M.A. (Toronto),
Sessional Lecturer in Mathematics*
- Philip Calder, B.A. (Toronto),
Seminar Leader in Journalism*
- Edwina Carson, B.A. (Western),
Instructor in English
- A. A. Cattnach, Q.C., B.A. (Manitoba), LL.B. (Saskatchewan),
Sessional Lecturer in Public Law*
- Marcus S. Chappell, B.A.SC. (British Columbia),
Sessional Lecturer in Engineering
- L. C. Clark, B.A. (Manitoba), M.A. (Toronto),
Sessional Lecturer in History*
- E. P. Cockshutt, B.A.SC. (Toronto), S.M., MECH.ENG., SC.D. (M.I.T.),
Sessional Lecturer in Engineering*
- L. S. Collett, B.SC. (McMaster), M.A. (Toronto),
Sessional Lecturer in Geology
- Jean Collins, M.A. (McGill),
Instructor in English
- Murray E. Corlett, B.A. (Toronto),
Sessional Lecturer in Commercial Law*
- Carl B. Crawford, B.SC. (Queen's), M.SC. (Northwestern),
D.I.C. (London),
Sessional Lecturer in Engineering*

*Part time

Douglas Keith Dale, B.A. (Queen's),
 Sessional Lecturer in Mathematics*
 G. S. DuVernet, M.A. (Toronto),
 Sessional Lecturer in French*
 Simon L. Eckstein, B.A., B.R.E. (Yeshiva), M.A. (N.Y.U.),
 Sessional Lecturer in Religion*
 Belle Elliot, B.A. (Queen's),
 Instructor in English
 R. T. Elworthy, M.B.E., B.SC., PH.D. (London),
 Demonstrator in Chemistry*
 Ivan Fellegi, M.SC. (Carleton),
 Sessional Lecturer in Mathematics*
 G. Fischer, DIPL.PHYS. (E. T. H. Zurich), DR. ès Sc. (Neuchâtel),
 Sessional Lecturer in Physics*
 Kenneth Flaherty,
 Field Work Supervisor in Journalism*
 James C. Gardner, B.A., M.ED. (Toronto),
 Sessional Lecturer in Mathematics*
 T. Gigantis, M.A. (McGill),
 Sessional Lecturer in Economics*
 N. M. Goble, M.A. (Edinburgh),
 Sessional Lecturer in Classics*
 Ronald Grantham, M.A. (British Columbia),
 Sessional Lecturer in History*
 Rodney Grey, B.A. (Queen's), M.A. (Toronto), PH.D. (London),
 Sessional Lecturer in Political Science*
 Naomi E. S. Griffiths, B.A. (London), M.A. (New Brunswick),
 Instructor in History
 A. M. Guénault, B.A., PH.D. (Cambridge),
 Sessional Lecturer in Physics
 Gordon F. Henderson, Q.C., B.A. (Toronto),
 Sessional Lecturer in Public Law*
 Walter B. Herbert, B.A., LL.B. (Alberta),
 Seminar Leader in Journalism*
 Frances Hobson, M.A.,
 Sessional Lecturer in Mathematics*
 C. S. Juvet, B.COM. (Queen's), M.A. (Carleton),
 Sessional Lecturer in Political Science*
 George J. Klein, B.A.SC. (Toronto),
 Sessional Lecturer in Engineering
 John A. Knapp, M.A. (Cambridge and Oxford),
 Sessional Lecturer in Economics*

*Part time

- Valerie Knowles, B.A. (Smith), M.A. (McGill),
Sessional Lecturer in History*
- Eva Kushner, B.A., PH.D. (McGill),
Sessional Lecturer in French*
- Roy La Berge,
Field Work Supervisor in Journalism*
- D. I. Lalkow, M.D. (Moscow),
Sessional Lecturer in Russian (Honorary)
- Albert B. Larose, B.COM. (Carleton), C.A.,
Sessional Lecturer in Accounting*
- A. B. Laver, M.A. (Queen's),
Sessional Lecturer in Psychology*
- Roderick C. McDonald, B.A.SC. (Toronto),
Sessional Lecturer in Engineering*
- T. F. S. McFeat, B.A. (McGill), PH.D. (Harvard),
Sessional Lecturer in Sociology*
- F. H. McLearn, B.E. (Dalhousie), PH.D. (Yale), F.R.S.C., F.G.S.A.,
Sessional Lecturer in Geology*
- J. M. McQueen, M.A. (Toronto),
Honorary Lecturer in History
- Madeleine Mélése, L. es Sc., Licencié d'enseignement (Sorbonne),
Sessional Lecturer in French*
- Carman H. Milligan, MUS.BAC. (Toronto), M.MUS. (Rochester),
Sessional Lecturer in Fine Arts*
- Peter Mackenzie Millman, B.A. (Toronto), A.M., PH.D. (Harvard),
Sessional Lecturer in Astronomy*
- Cecil H. Ney, B.A.SC. (Toronto), O.L.S., D.L.S.,
Sessional Lecturer in Engineering
- E. R. Niblett, M.SC. (Toronto), PH.D. (Cambridge),
Sessional Lecturer in Geology*
- B. R. Pelletier, M.SC., PH.D.,
Sessional Lecturer in Geology*
- Mary Anne Phillips, M.A. (Toronto),
Instructor in English*
- June Pimm, B.A., M.S.PS. (McGill),
Sessional Lecturer in Psychology*
- Alan H. Portigal, B.SC. (McGill), A.M. (Tufts),
Sessional Lecturer in Sociology*
- R. Potter, M.SC. (New Brunswick),
Sessional Lecturer in Geology*
- L. W. Rentner, B.A. (Toronto),
Sessional Lecturer in Mathematics*

*Part time

- Peter Roberts, B.A. (Alberta), M.A. (Alberta and Oxford),
Sessional Lecturer in Political Science*
- J. K. B. Robertson, B.A. (Queen's), M.A. (Toronto),
Sessional Lecturer in Fine Arts*
- P. Robinson, PH.D. (Cape Town),
Sessional Lecturer in Mathematics*
- M. Romanowski, M.A. (Geneva),
Sessional Lecturer in Physics*
- R. Ruedy, PH.D. (Geneva),
Demonstrator in Physics
- M. Rukiewicz, CIV.ENG. (Warsaw),
Sessional Lecturer in Mathematics*
- Velma Rust, B.SC., M.ED. (Alberta), PH.D. (Illinois),
Sessional Lecturer in Mathematics*
- J. H. Scarffe, B.A. (McMaster), M.A. (Toronto),
Sessional Lecturer in Political Science*
- W. H. Showman, M.A. (Queen's),
Sessional Lecturer in Classics*
- V. E. F. Solman, M.A., PH.D. (Toronto),
Sessional Lecturer in Biology*
- D. G. Stephenson, B.A.SC. (Toronto), PH.D. (London),
Sessional Lecturer in Engineering*
- A. A. Sterns, LIC. COM. (St. Gallen), DR.RER.POL. (Berne),
Sessional Lecturer in Accounting*
- John S. Tener, M.A., PH.D. (British Columbia),
Sessional Lecturer in Biology*
- Ruth M. Underhill, B.A. (Saskatchewan), M.A. (Toronto),
Instructor in English
- Hans J. von Baeyer, PH.D. (Heidelberg),
Sessional Lecturer in Engineering*
- M. Waddams, M.A. (Oxford),
Special Lecturer in German
- J. Stewart Wells, B.SC. (McGill),
Sessional Lecturer in Economics*
- A. J. Wickens, M.SC.,
Sessional Lecturer in Mathematics*
- A. M. Willms, M.A. (Toronto),
Sessional Lecturer in Political Science*
- Alice E. Wilson, M.B.E., B.A. (Toronto), PH.D. (Chicago), F.R.S.C.,
F.G.S.A., LL.D. (Carleton),
Sessional Lecturer in Geology*
- T. Y. Wu, B.SC. (Nankai), A.M., PH.D. (Michigan), F.R.S.C.,
Sessional Lecturer in Physics*
- Douglas Wurtele, B.A. (London),
Sessional Lecturer in English*

*Part time

SUMMARY OF DAY AND EVENING COURSES

FACULTY OF ARTS AND SCIENCE

DIVISION OF HUMANITIES AND SOCIAL SCIENCES

Bachelor of Arts (B.A.)—

Offered in both day and evening divisions. Details on pp. 39-42.

Bachelor of Arts with Honours—first two years offered in both day and evening divisions; last three years in day division only. **See also pp. 67-69.**

Bachelor of Arts with Honours in Public Administration (B.A.)—

Details on pp. 52-53.

First two years offered in both day and evening divisions; last three years in day division only.

Certificate in Public Service Studies (C.P.S.S.)—Details on p. 54.

Offered in day and evening divisions.

Graduate Diploma in Public Administration (Dip. Pub. Admin.)—

Details on pp. 55-56.

Offered in both day and evening divisions.

Master of Arts in Public Administration (M.A.)—Details on pp. 56-57.

Offered in day division only, except with permission.

Bachelor of Commerce (B.COM.)—Details on pp. 43-45.

Offered in both day and evening divisions.

Bachelor of Journalism (B.J.)—Details on pp. 46-50.

First two years offered in both day and evening divisions; last two years, and postgraduate year, offered in day division only.

DIVISION OF SCIENCE

Bachelor of Science (B.SC.)—Offered in both day and evening divisions. **Evening candidates normally expected to take certain senior courses in day division.** Details on pp. 58-60.

Bachelor of Science with Honours—first two years offered in both day and evening divisions; last three years in day division only.

See also pp. 67-69.

SCHOOL OF ENGINEERING

Bachelor of Engineering (B.ENG.)—Details on pp. 61-66.

Offered in the day division only.

HONOURS COURSES

The program is fully described on pp. 67-69, and the detailed offerings and requirements by subject areas on pp. 75-165.

GRADUATE PROGRAMS IN ARTS AND SCIENCE

Master of Arts (M.A.) and *Master of Science (M.SC.)*; *Doctor of Philosophy (PH.D.)*.

Graduate Programs in Engineering, see p. 66.

For a description of graduate offerings at Carleton University, please see pp. 70-72.

COURSES FOR THOSE WHO ARE NOT CANDIDATES FOR CERTIFICATE, DIPLOMA, OR DEGREE

Subjects in the curricula of the Faculty of Arts and Science and the School of Public Administration are open to persons who do not wish to study for a certificate, diploma, or degree, providing that they have the required background for those they choose.

As an extension service, non-credit courses in subjects of cultural and vocational value are open to members of the public. The Committee on Adult Education issues a number of bulletins describing this program. Copies can be obtained, on request, from the Registrar's Office.

COURSES IN CENTRES OUTSIDE OTTAWA

By agreement with other universities of Ontario, Carleton University is prepared to offer university courses in centres outside Ottawa in the counties of Carleton, Dundas, Grenville, Lanark and Renfrew, and to consider applications for academic credit for courses taken from other universities in other centres.

PRE-PROFESSIONAL COURSES

Students who plan to undertake further professional training after completion of their studies in Carleton University are invited to consult the Registrar for aid in selection of their courses.

Among the fields for which **preparatory** courses may be planned at Carleton are:

Graduate Studies in	Law	Accounting
Arts and Science	Theology	Architecture
Public Administration	Teaching	Forestry
Medicine	Library Science	Pharmacy
Dentistry	Social Work	Surveying (D.L.S.)

Special arrangements have been made for studies at Carleton in preparation for the examinations of the Society of Industrial and Cost Accountants of Ontario, and the Chartered Institute of Secretaries of Joint Stock Companies and other Public Bodies, and for entry to the Ontario College of Education.

Admission by Equivalent Examination

Examinations Equivalent to the Ontario Secondary School Graduation Diploma

The following certificates recognized as equivalent to the Ontario Secondary School Graduation Diploma may be accepted in so far as they meet the admission requirements of Carleton University (see p. 39).

Quebec	Quebec High School Leaving, or McGill Junior Matriculation
Alberta	Junior Matriculation (Grade XI)
British Columbia	Junior Matriculation (Grade XII)
Manitoba	Grade XI
New Brunswick	Junior Matriculation (Grade XII)
Newfoundland	Grade XI
Nova Scotia	Junior Matriculation (Grade XI)
Prince Edward Island	First Class License or Second Year Certificate from Prince of Wales College
Saskatchewan	Grade XI

Examinations Equivalent to Grade XIII (Canada and Great Britain)

The following certificates recognized as equivalent to the Ontario Grade XIII certificate may be accepted in so far as they meet the Senior Matriculation requirements of Carleton University.

Quebec	Quebec Senior High School Leaving Certificate, or McGill Senior Matriculation
Alberta	Senior Matriculation (Grade XII)
British Columbia	Senior Matriculation (Grade XIII)
Manitoba	Grade XII
New Brunswick	Senior Matriculation (Grade XIII)
Nova Scotia	Senior Matriculation (Grade XII)
Prince Edward Island	Honour Diploma of Third Year, Prince of Wales College
Saskatchewan	Grade XII
England, Northern Ireland, and Wales	The General Certificate of the various English Universities and the Welsh Joint Education Committee with passes in six subjects, of appropriate distribution, of which two must be at the Advanced Level.
Scotland	The Scottish Higher Leaving Certificate

Certificates from the United States and other lands are accepted in so far as they are equivalent.

UNIVERSITY SERVICES AND FACILITIES

CLASS HOURS

Most classes (day and evening) meet for three hours a week. Those involving laboratory work usually meet for that purpose for an additional three or four-hour period once a week.

Summer session evening classes usually meet for two and one-half hours on each of two evenings a week with additional laboratory periods weekly in science courses. Summer day classes meet usually for two hours a day for six weeks.

Class timetables are published separately for the day and evening divisions, and may be obtained from the Registrar's Office.

FACILITIES

In 1959 the University moved to its present campus on the Rideau River. Three buildings, Science, Arts, and the Library, are in full operation.

The Henry Marshall Tory Building for Science, a contemporary five-level structure, is fully equipped for Engineering, Biology, Chemistry, Geology, and Physics studies, classrooms for all students, and a cafeteria.

The Maxwell MacOdrum Library, large enough to accommodate 480 readers and 108,000 volumes, also houses the administrative offices of the University.

The Arts building, Norman Paterson Hall, provides many additional classrooms and seminar rooms of various sizes for students of the Division of Humanities and Social Sciences, as well as offices for professors.

These three buildings are on three sides of the Main Court, the focal point of the University, and all are connected by a tunnel.

In addition, a modern field house and other athletic facilities have been provided.

By the fall of 1962, it is expected that two residence buildings, a classroom building, an addition to the Arts Building (Norman Paterson Hall), a university centre, and a cafeteria will have been erected.

Special interim facilities for student activities include rooms for Students' Council and student newspaper (The Carleton), dressing rooms and equipment rooms for athletics, small games rooms and lounges. Some space is available on the Main Court, the balance in the field house.

While major indoor athletic activity will continue to be carried out in gymnasiums of secondary schools, the University has its own regular and practice fields on the Rideau River campus.

STUDENT ACTIVITIES

All students in the day and evening divisions of the University are members of, and pay the fees of, the Students' Association. The Students' Council, executive body of the Association, is elected by the students in the spring of each year.

Activities sponsored by the Students' Association, through its Council, include the publication of a weekly newspaper, *The Carleton*; dances and parties; women's, dramatics, radio, poetry, choral, language and camera clubs; chess, bridge and sports clubs; commerce, science, and engineering societies; a debating society, a model parliament and political clubs; international affairs organizations; religious associations; welfare fund campaigns; and a wide variety of educational and recreational programs.

An Athletic Board, composed of representatives of faculty and students and responsible to the President, sponsors and supervises a program which includes the University band, recreational activities, intramural and intercollegiate activities.

STUDENT SERVICES

Health. Under the supervision of the University Medical Adviser, a Student Health Service is provided for the protection and promotion of the health of the student body. Its primary purposes are:

To supervise the health of all full-time students and to ascertain their fitness for academic work.

To investigate the physical fitness of all students who wish to participate in college athletic and recreational activities.

To provide a health consultation and advisory service for students. (Those with serious health defects are referred for treatment as necessary.)

To provide emergency treatment and medical care for athletic injuries and minor illnesses.

To plan a health education program designed to conserve and promote the overall health of the student body.

Prior to initial registration at the University, each full-time student is required to submit, on a personal health record form provided by the University, a certificate of medical examination performed by his family physician. Each year, in addition, a full-time student will submit evidence of having had a chest X-ray within six months prior to the opening of classes, or as an alternative to such chest X-ray a negative intracutaneous tuberculin skin test. Students electing to have the skin test in lieu of chest X-ray are advised to have such test conducted by the family physician at the time of the medical examination. Students who are

tuberculin positive will be required to undergo a chest X-ray as above. Chest X-rays may be arranged, free of charge, at the May Court Clinic, 374 Besserer Street, Ottawa, at any time after May 15. (Carleton students may be examined, except in July, on Tuesday, Wednesday, or Thursday, 2 to 4 p.m.). During the week of registration, September 12-15 inclusive, the Clinic will be set aside for Carleton students from 9-11:30 a.m. Unless the X-ray has been arranged through the University, it will be necessary for the student to furnish evidence of a negative report. X-ray facilities for part-time students will be made available by the University, and such students are encouraged to have an annual chest X-ray.

(Students who object to these examinations on religious grounds will provide the Medical Adviser with a written statement of the grounds on which they object, following consultation with the Medical Adviser.)

Each year before participating in University athletic activities, each student will report to the Medical Adviser and obtain a certificate of medical fitness which will be submitted to the Director of Athletics.

The Medical Adviser will re-examine any student he considers should be given further attention, as indicated by his review of pre-registration health record forms. Any student requesting re-examination may avail himself of the services of the Medical Adviser who will be available in his office in the Maxwell MacOdrum Library at stated periods.

The University is not responsible for expenses incurred as a result of injuries sustained by students while participating in athletic activities. Information regarding available accident insurance may be had on request from the University Bursar.

Employment. The Student Placement Service in the Registrar's Office offers assistance to students in obtaining part-time employment during the academic year, full-time employment during the summer vacation period, and permanent employment upon graduation. Assistance is offered to alumni of the University at any time. Students and graduates are asked to consult the Student Personnel Officer for placement assistance.

The Student Placement Service cooperates closely with the National Employment Service and the Civil Service Commission of Canada.

Housing. The University has at present no residences of its own, but a housing registry is maintained by the Student Personnel Officer (Office of the Registrar), offering assistance to students wishing rooms or rooms with board.

Cost of room and board is about \$70 a month. A room with breakfast and dinner rents for about \$65 a month; with breakfast only, \$35-\$40; without meals, \$25-\$30; room with light housekeeping privileges, \$30-\$35.

Food. A cafeteria is located in the Science building, and a snack bar in the lower level of the Library building.

Approximate Cost of One Year (8 months) at the University for a Student of Moderate Means

1. Tuition: Arts, Commerce, Journalism, Science	\$ 465
Engineering	\$ 525
2. Books, Instruments, and Supplies	\$40-100
(The maximum named is typical of second-year Engineering Students)	
3. Board and Room — 2 meals in home, luncheon in College Cafeteria	\$ 670
4. Clothes, Laundry, Entertainment, Transportation	220-300
Total	\$1395-1595

Counselling and Guidance. Services available to students are:

1. A series of *orientation lectures* on study methods, the use of the university library, the university curricula, and related topics are arranged for new students in the day division during the week of registration.

2. All undergraduates enrolling in the day division for the first time at Carleton University are required to take any tests deemed suitable for the orientation programme.

3. A library of *occupational information* is at the disposal of students, occasional lectures on specific occupational fields are arranged, and guidance in methods of seeking employment is provided.

4. Students are invited to seek assistance in their planning of educational programs, their choice of careers, and in the solution of their personal problems from: (a) their instructors, especially their designated Faculty Adviser; (b) administrative officers, particularly the Dean (Dr. James Gibson), the Associate Dean (Dr. M. S. Macphail), the Registrar (Dr. John McLeish), the Student Affairs Adviser (Mr. Norman Fenn); and the Student Personnel Officer (Mrs. Jean Loates.)

5. Special and more extended counselling in career planning and personal problems may be obtained from Dr. F. R. Wake, Associate Professor of Psychology, and Chairman of the Department of Psychology, and also from Mr. Fenn, Student Affairs Adviser.

6. Faculty Adviser to Overseas Students: Dr. Charles Fleischauer is the Adviser to Overseas Students, and he may be consulted by appointment at his office in the Department of French.

7. The Registrar, Dr. McLeish, is available for consultation each Monday evening from 6.30 to 8 p.m., in addition to his regular day-time office hours.

MILITARY TRAINING

Each of the Services enrolls undergraduates in reserve training programs designed to qualify cadets for commissions.

Each year is divided into two training periods, winter training of about two hours per week, and summer full-time training and service.

During the summer training period, cadets receive junior officers' pay (currently \$235 per month); rations, quarters, transportation, uniforms, and medical services are provided free.

During the winter training period, cadets may receive up to 16 days pay per academic year.

Upon successful completion of training, cadets are commissioned, and upon graduation they are eligible for transfer to Regular or Reserve components.

REGULAR OFFICER TRAINING PLAN (R.O.T.P.)

The Armed Forces of Canada subsidize a limited number of undergraduate students who are willing to accept a military service obligation as a commissioned officer under the provisions of Regular Officer Training Plan.

University students found acceptable will be enrolled in the service of their choice (Royal Canadian Navy, Canadian Army (Regular) or Royal Canadian Air Force), as an officer cadet on a career basis. Upon achievement of degree status and fulfilment of military training requirements, Officer Cadets are promoted to commissioned rank and required to serve a minimum of three years immediately thereafter in the service which sponsored their training. After such service, an officer may be released at his own request providing a period of national emergency does not exist.

A student may qualify for subsidization under this Plan if he:

- (a) is a Canadian citizen or British subject resident in Canada with the status of a landed immigrant;
- (b) has attained his 16th but not his 21st birthday on the 1st of January of the year of enrolment in university;
- (c) is physically fit for enrolment in the branch and service of his choice;

(d) is single and intends to remain so during his officer cadet training period.

Successful applicants will receive financial assistance as follows:

Pay	\$63.00 per month
Living Allowance	\$65.00 per month
Holiday	Up to 30 days annually with full pay and allowances.

Tuition and other essential university fees	Provided by Department of National Defence.
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Text-book and Instrument expenses	\$75.00 per year.
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Medical and Dental care expenses	Provided by Department of National Defence.
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Uniforms and accoutrements	Provided by Department of National Defence.
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Aircrew Trainees receive \$75.00 per month flying pay while undergoing summer training.

Students interested in these training programs are requested to inquire of the service representatives listed below:

For all
armed forces Resident Staff Officer,
 Captain J. G. R. L. Brisébois,
 CE 4-4123 or 9-6-7623.

Navy: Staff Officer, U.N.T.D.,
 H.M.C.S. *Carleton*,
 Dow's Lake, Ottawa, Ontario; Tel. 9-4-5044

Army: Officer Commanding, Major J. M. Holmes, Department of
Chemistry. CE 5-3773.
 C.O.T.C. Office, Room 472 Science Building
 Telephone CE 4-4123

Air Force: Squadron Headquarters, 162 Waller Street; Telephone
 9-6-8615; or
 Flight Lieutenant Paul Laughton, Carleton University
 R.C.A.F. Representative (Department of Chemistry).
 CE 5-3773.

FEES

TUITION FEES

The annual composite fee includes tuition, Students' Association Athletics and Health Service fees, and where applicable laboratory, graduation, and summer survey camp fees.

Arts, Commerce, Journalism

Full-time students \$465.00

Part-time students (per subject) \$ 85.00

Science

Full-time students \$465.00

Part-time students (per subject) \$ 85.00

Engineering

Full-time students \$525.00

Included in the above composite fee are the following:

	Part-time per subject	Full- time
Students' Association	1.50	17.50
Athletics50	5.50
Health Services	—	2.00
University Centre Contribution (as voted by student body)		10.00

GRADUATE FEE

See Graduate School, p. 70.

LATE REGISTRATION FEE

Full-time students:

\$10 first week after registration period

\$15 second week

Part-time students:

\$1 (per course) first week after registration period

\$2 (per course) second week

EXAMINATION FEES

- (a) Supplemental and special final examinations, written at Carleton University, per paper..... 5.00
- (b) Examinations written at a university centre other than Carleton University, when permitted..... 10.00

TRANSCRIPT FEE

For each transcript of academic record, except for the first two which are supplied free of charge..... 1.00

DEFERRED PAYMENT FEE

Payable when fees are paid in instalments:

	<i>In Two Instalments</i>	<i>In More Than Two Instalments</i>
(a) for half course50	1.00
(b) for 1, 1½, or 2 courses	1.00	2.00
(c) for more than two courses	2.50	5.00

Fees may be paid by any of the following plans:

1. Payment in full at the time of registration.
2. Payment in *two* instalments:
 - (a) At registration— $\frac{1}{2}$ of the total tuition, *plus* Miscellaneous Fees (where applicable), and Deferred Payment Fee (see above).
 - (b) At or before mid-session—the remaining half of the total tuition fee.
3. Payments in *five* instalments (winter session only):
 - (a) At registration— $\frac{1}{5}$ of the total tuition, *plus* Miscellaneous Fees (where applicable), and Deferred Payment Fee (see above).
 - (b) On the 15th of October, November, January and February— $\frac{1}{5}$ of the total tuition fee.

WITHDRAWAL AND REFUND

Students who are forced to withdraw from a course, or from the University, are required to notify the Registrar **in writing, or fill out the appropriate forms in his office**, and to give their reasons for withdrawal. The University assumes the obligation of carrying the student and accommodation on a yearly basis. Therefore:

- (a) Credits or refunds will be granted as follows:
 - (1) Cash refunds will be granted in cases where students are compelled to withdraw on account of serious and continued personal illness.
 - (2) In case a student who is regularly employed during the day is sent out of the city permanently by his employer or compelled so to change his working hours as to prevent his continuing at the University, a refund will be granted.
 - (3) Cash refunds may also be granted in cases where the student is compelled to withdraw for other personal reasons, provided that these reasons are satisfactory to the University authorities.
- (b) Tuition not refunded or used may, if a certificate of credit is secured from the Bursar, be applied upon subsequent courses pursued in the University, provided such courses are taken within two years of the date of withdrawal of the student.
- (c) Miscellaneous fees and Deferred Payment fees are not refundable.
- (d) The portion of the tuition fee refunded is determined by the **date of written application for refund**, not the date of withdrawal.
- (e) No application for withdrawal and refund will be considered if received after February 15 in the winter session, or after July 31 in the summer session.

GENERAL REGULATIONS

CLASSIFICATION OF STUDENTS

Students, whether in the day or the evening division, are classified as *undergraduates* or *graduate students* if they are properly matriculated for and proceeding to a degree, diploma or certificate; otherwise they are classified as *special students*. They are considered to be *full-time* students when enrolled for four or more subjects in an academic session, and *part-time* students when enrolled for fewer than four.

CREDIT FOR SENIOR MATRICULATION COURSES

An applicant who has completed Junior Matriculation at the required level may be admitted and given credit for such Senior Matriculation subjects as are *appropriate to the first year pattern for the degree* provided that he has obtained at least an average of fifty-five per cent in examinations taken. He will be given an opportunity to make up his course deficiencies as part of his program in the University.

No more than five senior matriculation subjects taken in a secondary school may be counted toward a Carleton degree.

Except by permission of the Committee on Admission and Studies, to which students should make application through the Registrar, no student will be given credit for senior matriculation subjects passed in a secondary school system after he has been registered as an undergraduate in Carleton University. Such permission is granted only rarely, and then only if the prescribed subject is not made available by the University. (This regulation governs students admitted as undergraduates in and after 1954.)

SUBSTITUTION FOR PRESCRIBED SUBJECTS

A student whose mother tongue is not English, and whose previous academic training has not been in English, may apply to the Committee on Admission and Studies for permission to substitute an approved course in the humanities for the prescribed course in a language other than English.

COURSE LOAD

Normal course load for a *full-time* student in the winter session is five full courses. Except in honours courses, no more than five full courses may be taken for credit in the winter session, unless by permission of the Committee on Admission and Studies. Students in the third and fourth years who wish to transfer from one course to another, must obtain the approval of their major departments. All transfers must be made *within two weeks following the opening of classes*.

A student who has been in full-time attendance at Carleton in a

winter session may take a course in the following *summer session* only if it is required to make up a deficiency, is recommended by his major department in lieu of a subject in the following winter session, or is taken as an extra subject for no degree credit.

Normal course load for a *part-time* student who is employed full time is one or two full courses in each winter session and one full course in each summer session. No more than two full courses may be taken for credit in a winter session and no more than one in a summer session, unless by permission of the Committee on Admission and Studies. Special students are not allowed to take more than two courses per winter session, except with permission.

The Committee on Admission and Studies seldom will permit a student to take an extra course for credit unless in the previous academic session he has obtained better than average standing. With the consent of the instructor concerned, however, an undergraduate student (day or evening) enrolled for degree credit or a graduate student in the day or evening division may audit courses (i.e., attend without the privilege of writing examinations) concurrently with those being taken for credit, without the necessity of registering for or paying tuition for such audited courses.

ATTENDANCE

A student is expected to attend all lectures, discussion groups, seminars and laboratory periods of any course in which he is registered, whether such periods of work are formally scheduled by the University Registrar or informally announced by the instructor.

Each instructor will determine for his own courses the relation of class attendance to course grades, and whether attendance records shall be kept. Early in the session he will inform his students of his practice in this regard.

The Senate may, at any time, either during the term or after the close of the term, require any student to withdraw from the University if his conduct, attendance, work, or progress is deemed unsatisfactory.

STANDING

A student's standing in his year's work will be determined not only by the results of mid-year and final examinations, but also by the work of the whole term or session, including consideration of class tests, laboratory work, essays, attendance, progress and any other matters bearing on the candidate's worth as a student of the University.

Standing in all courses in the University is graded by the letters A, B, C, D (all unconditional passing grades) or F (failure). For the purpose of determining a student's average standing, a point value is assigned to each of these letter grades: A = 4, B = 3, C = 2, D = 1, F = 0.

To receive credit toward a degree, a candidate must obtain at least a "D" grade in the work of each course. In order to receive second class standing in his year's work, a student must have obtained an average of at least 2.4 grade points. In order to receive first class standing in his year's work, he must have obtained an average of at least 3.4 grade points.

Candidates for degrees must obtain a grade of "C" or better in at least half of the courses taken at Carleton.

In order to enter Third year, a student must have at least "C" or equivalent standing in the courses of his major subject or subjects.

In order to qualify for graduation, a student must have at least "C" or equivalent standing in his major subject or subjects.

The above regulations regarding standing apply in all fields except Engineering.

Additional regulations are stated in the outlines of the various degree programs, pp. 39-74.

Additional symbols used to indicate standing are as follows:

Aeg.—Aegrotat: absent from final examination but standing granted on basis of year's work; (a student granted *aegrotat* may write a special examination for a grade in the course.)

Pass—Passed supplemental examination but not otherwise graded. (Grade-point value=1.)

Abs.—Absent from final examination. (At the discretion of the instructor, an *undergraduate* or *graduate student* who is absent from the final examination may be graded "F(ns)" if his term work has been quite unsatisfactory.)

F(ns)—Failure; no supplemental examination allowed. This is normally given when a student has unsatisfactory laboratory work and/or unsatisfactory term assignments, or if he receives a mark so low in the final examination that the privilege of a supplemental does not seem justified.

Wdn.—Withdrawn in good standing.

Students who wish to withdraw from courses must apply in writing to the Registrar, or fill out the appropriate forms in his office.

A student may not withdraw *in good standing* from any course for which he is registered, after February 15 in the winter session or July 31 in the summer session, except by permission of the Committee on Admission and Studies. If the student should withdraw from a course without such permission, and fails to write the final examination, his record will show that he was absent from the examination and he shall

not have the privilege of writing a supplemental examination in that subject.

A candidate must obtain complete standing in the Qualifying University Year before registering in the Second year, and complete standing in the First year before registering in the Third year of any course. Students transferring from other universities with credits toward their degree, but lacking early Carleton requirements, must consult the Registrar for their obligations under this rule.

FAILURE AND REPETITION

A student taking five or more subjects who fails in more than two subjects will be considered to have failed his year. A student taking fewer than five subjects who fails in more than one subject will be considered to have failed his year. In neither case will the student be permitted to write further examinations in any of the subjects of that year without repeating them, and will retain credit only in those subjects in which he obtained "C" or higher standing. (For regulations governing failure in Engineering, see page 66.)

A student who has failed his year at Carleton University or elsewhere may apply to the Committee on Admission and Studies for permission to repeat the year's work. If permission is granted, he will be placed on probation for that academic year and must pass all courses taken (at regular or at supplemental examinations if allowed) in order to be restored to good standing. A student on probation who fails a course (including its supplemental examination if allowed) will be considered to have failed his year, and will normally forfeit his undergraduate status. He will retain credit (as a special student) only in those courses in which he obtained "C" or higher standing. A student placed on probation in the evening division must pass five courses in succession in order to regain good standing. Students must in all cases meet the terms of probation assigned by the Committee on Admission and Studies.

An undergraduate who has, in any event, failed his year twice forfeits his undergraduate status.

EXAMINATIONS

Mid-year examinations are held in all first-year and second-year lecture courses and in others at the discretion of the instructor, and final examinations in all courses, at the times listed under the Academic Year, p. 5. With few exceptions, a single, joint final examination is set for day and evening classes in the same subject—usually during morning or afternoon hours. In full courses in which no formal mid-year examinations are held, mid-year grades will be given, when possible, on the basis of assignments, tests and other term work during the first term.

Any student who is absent without good cause from a university examination, scheduled by the Registrar's Office, will not receive credit in the course. Such cause may be for certified medical disability, compassionate claim, or comparable reason acceptable to the Committee.

Special examinations. A student who, because of illness, has failed to write the scheduled mid-year or final examination in any course may apply for *aegrotat* standing or for permission to write a special examination provided he presents to the Committee on Admission and Studies the appropriate (University) medical certificate, duly completed and signed by his attending physician or surgeon. Students actually under medical treatment from an attending physician or surgeon in the period immediately prior to the examinations are reminded that it is their responsibility to notify the University that this situation exists if it is certain to affect their attendance at the examinations.

Reasons other than medical must also be fully documented for consideration by the Committee.

A student who, for such medical or for other acceptable reasons, has not written a final examination on the appointed date may be required, or may apply for permission, to take a *special final* examination. Special final examinations, and arrangements for taking them, may be authorized only by the Committee on Admission and Studies. These are written at the time of the supplemental examinations. For fee, see p. 30.

Applications stating cause must be submitted in writing to the Registrar, for consideration by the Committee on Admission and Studies. This must be done not later than one week after the date on which the examination was held.

Supplemental examinations. All supplemental examinations in courses taught during the winter session are held in late August or early September, at the University, with the exception of supplemental examinations for January half-course finals — these supplementals are held in May. Summer course supplemental examinations are written in November. For exact dates, see The Academic Year, p. 5. Fees are shown on p. 30.

An undergraduate student who has been graded "F" on a final examination, but has not failed his year, may write a supplemental examination in that subject at the time of the next regular supplemental examinations. In such cases the supplemental examination ordinarily will be graded only "Pass" or "Failure".

A student who fails a course primarily because of unsatisfactory laboratory and/or term work may be graded "F(ns)", meaning that he may not write a supplemental examination in that course. Likewise, he may receive this grade if he has obtained a mark so low in the final

examination that the privilege of a supplemental does not seem justified. The privilege of writing supplemental examinations will be thus denied only in such cases, and the student shall have the right of appeal to the Committee on Admission and Studies.

A student wishing to raise a grade in a course already passed may apply to the Committee on Admission and Studies for permission to write a *special supplemental* examination. A special supplemental examination is the same as an *ordinary* supplemental examination except that it is graded on the scale A, B, C, D, F.

Such a student, if granted permission to rewrite a subject for higher standing, may do so, once only, at the next regularly scheduled supplementary examination period. Students are advised that when they write special supplemental examinations for the purpose of raising their standing, the final grade assigned in any subject will be based on the whole year's work, including the supplemental, and that the grade obtained in the supplemental may be the grade retained even when it is lower than the grade derived from the previous final examination.

If a supplemental examination is failed, the student will be required to repeat the course before coming up for examination in that course in any subsequent year.

No student may write supplemental (including special supplemental) examinations in more than two subjects (two full courses or the equivalent in half-courses) in any year.

Official course grades are released only by the Registrar. Year-end reports are mailed to students as soon as possible after the release of grades has been authorized. Upon the request of a student, a duplicate of his report will be sent to his employer or another designated person.

PROFICIENCY IN ENGLISH

All students in the Qualifying University Year in Arts, Journalism, Commerce, and Science take English 120 (English Literature and Composition). If this course is not passed in the first year, it must be repeated until passed. Thereafter, in any year of course, a student may be required to receive additional tuition in the use of the English language as prescribed by the Department of English, to which he may be referred, at any time, by an instructor in any department.

LIBRARY REGULATIONS

All persons taking courses in the University, and all graduates of the University resident in Ottawa, are entitled to use the library the year round.

Most books may be borrowed for four weeks and renewed if not requested by another reader. Some books are placed on "Reserve" and

may not be renewed. If they are not returned when due, a fine of 25c. for the first hour or part of an hour, and 10c. for each hour or part of an hour thereafter, is charged. When books borrowed for four weeks are kept long overdue, they become subject to reserve book fines.

Reference books may not be taken from the library.

Library hours are listed on the final page.

Every entering undergraduate in the day division will be required to complete satisfactorily an exercise in the use of the library, including the card catalogue, bibliographical sources, and standard reference works.

ACADEMIC COSTUME

For the Bachelor's and Master's degrees, the academic dress of Carleton University is of the design specified in the intercollegiate code. The hood is of *simple* shape, made of black *stuff*, and lined in silver with two chevrons of equal width inserted, that near the border, red, and that near the peak of the cowl, black. The border of the hood denotes the degree awarded, according to the following colour combinations: Arts—white; Journalism—white with a cord of black superimposed upon the border, set in $\frac{1}{4}$ " from the lower edge; Science—golden yellow; Commerce—drab; Public Administration—drab with a cord of dark brown superimposed upon the border, set in $\frac{1}{4}$ " from the lower edge; Engineering—orange. The Bachelor's hood is approximately three feet in length, with a two inch border; the Master's, three and a half feet, with a somewhat wider border, and open to expose more of the lining.

The gown of the honorary Doctor of Laws degree is of the type described as *full*, of ankle length, and of a royal blue colour with revers and sleeves of a contrasting shade of light blue. The hood, made of the same royal blue material as the gown, with a purple border, is of the full rounded shape with a tippet, and open to the base so that the entire lining, which is similar to that of the lower degrees, is fully visible.

DETAILS OF COURSES OFFERED

II: DIVISION OF HUMANITIES AND SOCIAL SCIENCES

ARTS

Admission Requirements

(a) *To the Qualifying University Year* of courses leading to the Bachelor of Arts degree:

Junior Matriculation — the Ontario Secondary School Graduation Diploma in the General Course (Grade XII), or an equivalent certificate, with a general percentage of at least 65%. In cases where provincial Department of Education examinations are written, the general average will be 60%.

Standing is required in the following subjects:

1. English.
2. Mathematics (Algebra and Geometry).
3. History.
4. A language other than English.
5. Science (Physics and Chemistry; or Agricultural Science, Parts I and II) *or* an additional language.
6. Any *one* of: Music, Art, Geography, Agricultural Science, an additional language, or an additional science.

Mature Matriculation—A person over the age of twenty-three years who, though lacking the admission requirements specified above, can give evidence of the likelihood of success in university studies, may be admitted *on probation*. If he completes successfully the subjects of the Qualifying University Year, his matriculation will be confirmed and he will be given credit for the year. Persons interested should consult the Registrar.

(b) *To the First Year* of courses leading to the Bachelor of Arts degree:

Senior Matriculation—(1) Junior Matriculation or Mature Matriculation as prescribed above, and, in addition, (2) completion of the Qualifying University Year, or attainment of the Ontario Secondary School Honour Graduation Diploma (Grade XIII), or an equivalent certificate, with an average of not less than 55% in the papers written, and with standing in the following five subjects:

1. English Composition and Literature.
2. A language other than English.
3. Mathematics (2 or 3 of Algebra, Geometry, Trigonometry) *or* an additional language.

4. A science: Biology or Chemistry or Physics.
5. One of History or Geography or an additional language or an additional science.

See also p. 32, *Credit for Senior Matriculation courses*.

(c) *To the Second or subsequent years* of courses leading to the Bachelor of Arts degree:

Applications for admission to the Second or subsequent years will be evaluated on their merits, and advanced standing granted for studies undertaken elsewhere only when these are recognized as the equivalent of subjects offered in Carleton University.

Every student will be required to complete at least his last five courses in Carleton University.

Course Requirements

- *Bachelor of Arts*—(Offered in both day and evening divisions).

Length of course. Candidates for the Pass B.A. degree will take a total of twenty courses after Junior Matriculation, or fifteen after Senior Matriculation. See also *Course Load*, p. 32.

Course selection. The B.A. course is designed to provide opportunity for a liberal education, including specialization in one subject of study, called a *major*. The choice of a major will normally be made upon entry to the Second year, in consultation with the department or departments concerned, in any subject listed below. A *combined major* in two related subjects may be taken, with the consent of the departments concerned.

For 1961-62 the subjects are as follows:

Classics (Latin, Greek), Economics, English, French, German, Geography, History, Mathematics, Philosophy, Political Science, Psychology, Russian, Religion, Sociology, Spanish. (In certain cases, and with consent of the Department of Biology, a major in Biology in the B.A. course may be taken.)

Courses will be selected from those listed under Details of Subjects, pp. 75ff., as follows:

QUALIFYING UNIVERSITY YEAR

1. English 120.
2. A language other than English (a course numbered between 100 and 199).
3. Two or three of Mathematics 110, 111, 112 or Mathematics 116 or one of French 110, German 115, Greek 115, Italian 115, Latin 110, Russian 115, Spanish 115.
4. A science: Biology 200 or Chemistry 110 or Physics 200 or Geology 210.
5. History 110.

FIRST YEAR

Either one or two of the requirements specified below may be postponed until a later year, to permit substitution in the First year of an additional course or courses chosen from Groups 3 or 4, or Religion 215 or 220.

1. A course in English literature: English 210 or 221. (Students choosing English as a major will take English 221.)
2. An introduction to the problems of thought and conduct: Philosophy 215.
3. An introduction to the study of society: *one* of Economics 210, History 210 or 220, Political Science 210, Psychology 210, Sociology 210.
4. A language other than English: *one* of French, German, Greek, Italian, Latin, Russian, Spanish (a course numbered in the 200's Note that except in French and Latin, this may require a pre-requisite course numbered 115, which will carry a credit.)
5. *Either*: Mathematics 200 or 211
or: A science course chosen from Biology 200 or 210, Chemistry 210, Geology 210, Earth Science 200 or Physics 200.

SECOND AND THIRD YEARS

A total of ten courses, five in each year: a minimum of four (five, if one is not taken in First year) in the student's major. The others are to be chosen with the approval of the department or departments in which the major is taken.

Summer Reading Requirements

Students taking the course program leading to the B.A. are expected to fulfil summer reading requirements as announced, and should inform themselves of the requirements specified by each major department. *The degree will not be conferred upon students failing to meet this obligation.*

Proficiency in English. See p. 37.

Standing. General regulations regarding standing are stated on p. 33ff. In addition, a candidate for the B.A. degree must be recommended for graduation by his major department.

A student clearly below the required minimum standard at the end of his penultimate year prior to graduation may be required to withdraw from his major field by his department.

Honours Requirements in Arts (See p. 67ff.)

COMMERCE

● *Bachelor of Commerce* (Offered in both day and evening divisions)

The course leading to the degree of Bachelor of Commerce is designed primarily to provide an education with some concentration in economics and an introduction to those subjects likely to be of particular interest to students contemplating a business career. Because the aims of students differ widely, and because specific training can be gained more effectively in business itself than in academic courses, the Commerce course contains no specialized training in the techniques of business management and administration.

Admission Requirements

(a) *To the Qualifying University Year* of the course leading to the Bachelor of Commerce degree:

Requirements are the same as those for admission to the equivalent year of courses leading to the Bachelor of Arts degree (see p. 39).

(b) *To the First Year* of the course leading to the Bachelor of Commerce degree:

Senior Matriculation—(1) Junior Matriculation or Mature Matriculation as prescribed above (on p. 39) and, in addition, (2) completion of the Qualifying University Year, or attainment of the Ontario Secondary School Honour Graduation Diploma (Grade XIII) or an equivalent certificate with an average of not less than 55% in the papers written, and with standing in the following five subjects:

1. English Composition and Literature
2. A modern language other than English
3. Mathematics (Algebra, Geometry, and Trigonometry)
4. A science: Biology or Chemistry or Physics
5. One of History or Geography or an additional language or an additional Science.

See also p. 32, *Credit for Senior Matriculation Subjects*.

(c) *To the Second and Third Years* of the course leading to the Bachelor of Commerce degree:

Applications for admission to the Second or Third years will be evaluated on their merits, and advanced standing granted for studies undertaken elsewhere only when these are recognized as the equivalent of subjects offered in Carleton University.

Every student will be required to complete at least his last five courses in Carleton University.

Course Requirements

Length of course. Candidates for the Bachelor of Commerce degree must take a total of 20 courses after Junior Matriculation or 15 after Senior Matriculation. See also *Course Load*, p. 32.

Course selection. Courses will be selected from those listed under Details of Subjects, p. 75ff., as follows:

QUALIFYING UNIVERSITY YEAR

1. English 120
2. French 110 or a course numbered between 100 and 199 in another modern language¹
3. Mathematics 110, 111, and 112 or Mathematics 116
4. A science: Biology 200 or Chemistry 110 or Physics 200 or Geology 210
5. History 110

FIRST YEAR

1. English 210
or Philosophy 215
2. A further course in the modern language taken in first year or a science: Biology, Chemistry, Geology, or Physics
3. Economics 210
4. Accounting 210
5. Mathematics 200 or 211, or Political Science 210, or Sociology 210, or another course approved by a member of the Committee on Commerce Studies.

SECOND YEAR

1. Economics 300
2. Economics 310
3. Economics 320
4. Accounting 310
5. Any other course approved by a member of the Committee on Commerce Studies.

THIRD YEAR

Five courses chosen as follows:

1. Economics 315 or Economics 360
2. At least one Economics course in category 4 of the Economics program (p. 91).
3. Remaining courses to be approved by a member of the Committee on Commerce Studies.²

¹See also p. 32, *Substitution for Prescribed Subjects*.

²In addition to courses continuing from those taken in earlier years, students might wish to consider Commercial Law 210, or Public Law 310, or Mathematics 220.

Commerce students wishing to discuss their programs of studies should consult the Chairman of the Committee on Commerce Studies, who is their faculty adviser.

Students who, after achieving the B.Com. degree, intend to proceed to professional accounting degrees—Chartered Accountant (C.A.), Certified Public Accountant (C.P.A.), Certified General Accountant (C.G.A.), or Registered Industrial and Cost Accountant (R.I.A.)—should consult the Chairman of the Economics Department before entering the final year of the Commerce course. Any other students who are interested in professional accounting careers are referred to the special circular covering the various accounting degree-granting bodies. These students also may wish to consult the Chairman of the Economics Department.

Proficiency in English. see p. 37.

Summer Reading Requirements. Students taking the course program leading to the B.Com. are expected to fulfill summer requirements as announced. *The degree will not be conferred upon students failing to meet this obligation.*

Standing. General regulations regarding standing are stated on p. 33. For purposes of the Commerce course, these regulations are to be interpreted as follows:

- (i) A candidate for the B.Com. degree must obtain a grade of "C" or better in at least half of the courses taken at Carleton University for the degree.
- (ii) He must obtain a grade of "C" or equivalent on any six of his Economics and Accounting courses.
- (iii) He must obtain a grade of "C" or equivalent on any four such courses before being admitted into Third Year Commerce.

In addition, candidates must be recommended for graduation by the Committee on Commerce Studies.

JOURNALISM

DIRECTOR OF THE DEPARTMENT:

WILFRID EGGLESTON, M.B.E., B.A., F.A.G.S.
(on leave of absence, 1961-62)

W. H. KESTERTON, B.A., B.J., Chairman of the Department, 1961-62

ADVISORY COUNCIL

T. J. Allard, Executive Vice-President, *Canadian Association of Broadcasters*.

Raymond Daniell, Chief of Canadian Bureau, *The New York Times*.

Grant Dexter, Editor Emeritus, *The Winnipeg Free Press*.

Guy de Merlis, French Editor, *The Labour Gazette*.

D'Arcy Finn, Executive Editor, *The Ottawa Citizen*.

Michael Barkway, Ottawa Editor, *The Toronto Star*.

Norman M. MacLeod, Director, *United Press International* (BUP)

Dan C. McArthur, *Canadian Broadcasting Corporation*.

Robert McKeown, Staff writer, *Weekend Magazine*.

I. Norman Smith, Associate Editor, *The Ottawa Journal*.

A. Davidson Dunton, President of the University.

W. H. Kesterton, Chairman of the Department.

James A. Gibson, Dean, Faculty of Arts and Science.

J. A. B. McLeish, Registrar of the University.

- *Bachelor of Journalism* (First two years offered in both day and evening divisions; last two years offered in day division only)

The course in Journalism at Carleton University has been built on the conviction that what today's journalist needs most of all is a first-rate education, supplemented by thorough training in the basic skills of investigation and communication. The value of the journalism course arises largely from its intimate integration with the college studies in the liberal arts. The modern journalist is required to report and comment upon the whole range of social, political, economic, and cultural activities of his time. Before he can even ask intelligent questions about such matters, he must be grounded in the humanities and the social sciences. Nor can he know too much about a wide range of other fields of enterprise and learning.

The reporter is the link or bridge between the world of activity and investigation, and the great masses of readers and listeners. To be effective he must, therefore, master some of the fundamental arts of seeing, digging, interviewing, reading, organizing, reporting, and editing. Adequately equipped, he can readily apply his talents to any field of journalistic activity. The good newspaperman is noted for his ability to lay hold of information, and to see the value of the facts and opinions he acquires.

The course in Journalism at Carleton University thus emphasizes liberal scholarship and basic skills, in the belief that there are few practical applications of a specialized nature which cannot be subsequently acquired in a few weeks of actual work. While an array of "shop" courses in practical vocational training might appear to give more immediately useful crafts to the prospective journalist, it is assumed that no amount of "shop" training will carry a "cub" far if he lacks a broad background of liberal education and the intelligence to grasp and report the complex phenomena of modern society.

The opportunities in the national capital for the training of newspapermen and women are exceptional. The members of the parliamentary press gallery and staffs of the Ottawa newspapers, the press attachés of diplomatic missions, top executives in the radio broadcasting field, the public relations officers of government departments, and headquarters personnel of national associations are among the resources from which Carleton University can draw for guest lecturers and teaching material. Ottawa is the repository and headquarters of information upon almost every conceivable national and international topic. It is rich in cultural life. It is not going too far to say that residence for two or three years in the national capital can of itself be an education to anyone who purposes to make writing his or her career.

Admission Requirements

(a) *To the Qualifying University Year* of the course leading to the Bachelor of Journalism degree:

Requirements are the same as those for admission to the Qualifying University Year of courses leading to the Bachelor of Arts degree (see p. 39, Calendar).

(b) *To the First Year* of the course leading to the Bachelor of Journalism degree:

Senior Matriculation—(1) Junior Matriculation or Mature Matriculation as prescribed above and in addition, (2) completion of Qualifying University Year, or attainment of the Ontario Secondary School Honour Graduation Diploma (Grade XIII) or an equivalent certificate with an average of at least 55% in the papers written, and with standing in the following five subjects:

1. English Composition and Literature.
2. A language other than English.
3. Mathematics (2 or 3 of Algebra, Geometry, Trigonometry) or Latin.
4. A science: Biology or Chemistry or Physics.
5. One other, preferably History.

See also p. 32, *Credit for Senior Matriculation Subjects*.

(c) *To the Second and Third Years* of the course leading to the Bachelor of Journalism degree:

Undergraduates applying for admission to advanced standing with allowances on credits gained at their original college or university may be admitted to the Second or Third year, if their academic record is accepted as at least equivalent to the completion of the two previous years of Journalism in Carleton University. Normally, such applicants should offer standing in at least two of the following subjects in their previous work: Canadian History, Psychology, Economics, Political Science. Credit for courses previously taken will be arranged on application, subject to the stipulation that a minimum of a full year's work of at least the last five courses must be taken at Carleton University in order to qualify for the Bachelor of Journalism degree.

(d) *To the B.J. Course as a post-graduate year:*

The holder of a bachelor's or master's degree in Arts, Science, or Commerce may be permitted to enroll in the five Journalism subjects normally taught in the Second and Third years (Journalism 310, 320, 330, 340, 350), and thus qualify for the degree Bachelor of Journalism in one academic year. He may be required to take, in addition, certain of the courses in the liberal arts which are prescribed for undergraduates in Journalism, if the pattern of his previous studies is deficient in such background.

NOTE: Journalism students are urged to become reasonably proficient on the typewriter as soon as possible. All assignments in the courses Journalism 310, 320, 330, 340 and 350 (which are taken in the Second and Third years) will be done by typewriter.

Course Requirements

Length of Course. Candidates for the Bachelor of Journalism degree must take a total of twenty courses in four years if admitted by Junior Matriculation, or fifteen courses in three years if admitted by Senior Matriculation.

Course Selection. The course leading to the degree of Bachelor of Journalism will consist of subjects selected from those listed under Details of Subjects, as follows:

QUALIFYING UNIVERSITY YEAR

1. English 120 (English Literature and Composition).
2. French 110 (Readings in Modern French).
or a course numbered between 100 and 199 in another language¹.
3. Mathematics 116
or Latin 110 (First-year Latin).
4. A science: Biology 200 or Chemistry 110 or Physics 200 or Geology 210.
5. History 110 (Main Directions in Modern History).

FIRST YEAR

1. English 210 (English Authors from Chaucer to T. S. Eliot).
2. A further course in the language taken in first year.
3. An approved course in History.
4. Philosophy 215 (Introduction to Philosophy—which must be taken in Second year if not in First)
or Psychology 210 (General Psychology).
5. Economics 210 (Principles of Economics)
or Political Science 210 (Introduction to Political Science)
or Sociology 210.
6. Journalism 210 (Preparatory Lectures for First-year Journalism Students)—a non-credit course.

SECOND YEAR

1. Journalism 310 (Introduction to Journalism).
2. Journalism 320 (Fundamentals of Reporting).
3. History 330 (Canada from 1791)².
4. An approved option³ (Philosophy 215, if not already taken).
5. An approved option³.

THIRD YEAR

1. Journalism 330 (Editing).
2. Journalism 340 (Interpretative Reporting).
3. Journalism 350 (Career Seminar in Journalism).
4. An approved option³.
5. An approved option³.

¹ See also p. 32, *Substitution for Prescribed Subjects*.

² A student who comes to the University from another country may be advised to take a different sequence in History.

³ The subjects which will be recommended to students for their choice of options include: Political Science, Economics, Sociology, Philosophy, Canadian Geography, History, English, Social Psychology, French.

Proficiency in English. See p. 37.

Standing. General regulations regarding standing are stated on p. 33. In addition, a candidate for the B.J. degree must have at least "C" or equivalent standing in his Journalism courses, and specifically must obtain at least a "C" grade in Journalism 330, 340, and 350, and be recommended for graduation by the Department of Journalism. If after the regular examinations in any year a student is below that standard, he is advised to raise his grades in some subjects by writing special supplemental examinations.

PUBLIC ADMINISTRATION

DIRECTOR OF THE SCHOOL: R. OLIVER MACFARLANE, M.A., Ph.D.

ADVISORY COUNCIL

R. D. Boyd, Director, Personnel Branch, Post Office Department
R. B. Bryce, Clerk of the Privy Council, and Secretary to the Cabinet
G. F. Davidson, Deputy Minister of Citizenship and Immigration
J. Y. Harcourt, Executive and Professional Development Officer, Civil Service Commission
Hon. S. H. S. Hughes, Chairman, Civil Service Commission of Canada
E. F. Sheffield, Research Officer, Canadian Universities Foundation

A. Davidson Dunton, President of the University
James A. Gibson, Dean, Faculty of Arts and Science
R. Oliver MacFarlane, Director of the School
Donald C. Rowat, Professor of Political Science
J. A. B. McLeish, Registrar of the University
Pauline Jewett, Associate Professor of Political Science

THE PROGRAM

The rapid growth in government services during the last half century has increased the responsibilities and complicated the problems of public employees. The realization has been growing, therefore, that public administrators, whether federal, provincial, or municipal, can profit from a special type of education. Carleton University has been attempting to meet this need by offering programs of study as preparation for public administration.

Assisted by a \$200,000 grant from The Atkinson Charitable Foundation, the School of Public Administration was established September 1, 1953, to coordinate the various programs of study and to promote further development and research in the field. Four programs are now offered: the first leads to a Bachelor of Arts degree with Honours in Public Administration; the second to an undergraduate Certificate in Public Services Studies; the third to a graduate Diploma in Public Administration; and the fourth to the degree of Master of Arts in Public Administration.

The Honours B.A. program is planned on the assumption that the most suitable education for a person desiring to be a capable public administrator is broad and general in base, with specialization at a later stage. While it is designed to be of particular use to students contemplating careers in public employment, it also provides a sound general education for those considering the legal profession or business.

The Certificate and Diploma programs, on the other hand, will be most helpful to those who desire training in fields directly related to public administration. The Certificate course is designed to encourage public servants without university training to broaden their background. Since they are allowed degree credit for this work, they will also be encouraged, upon its completion, to continue toward a bachelor's degree. The graduate Diploma course, requiring more advanced studies, is available both to public servants in the evening division and to full-time day students. The M.A. program is offered to full-time students, but may be taken by part-time students, subject to conditions set forth on page 56. Several scholarships are available for M.A. candidates, and for both full- and part-time candidates enrolling for the graduate Diploma, and for full-time study toward the Certificate.

Public employees not interested in registering for studies leading to a degree, a certificate, or a diploma should note that they may take, as *special* students, any of the subjects listed in Public Administration programs for which they have the requisite background. Their attention is directed also to non-credit extension courses related to Public Administration which are offered from time to time by the University. Details may be obtained from the Office of the Registrar.

As Carleton University is located in the capital city and enjoys close relations with many government agencies, students of public administration may profit greatly from the unique advantages thus offered. Such institutions as the Library of Parliament, the Public Archives, the Dominion Bureau of Statistics, and the specialized libraries of the several government departments, all offer unusual opportunities for study in Ottawa. Advice and assistance are obtained from the Civil Service Commission and from officials of other government departments and agencies. Experienced public administrators give lectures or lead seminar discussions from time to time.

UNDERGRADUATE COURSES

- *Bachelor of Arts with Honours in Public Administration* (First two years offered in both day and evening divisions; last three years offered in day division only.)

Course Requirements

Candidates for the degree of Bachelor of Arts with Honours in Public Administration must satisfy all requirements for the degree of B.A. with Honours.

Course selection. The work of this course involves prescribed studies in Political Science, History, Economics and Public Law, and in approved options, as outlined below:

FIRST YEAR

Students intending to enter Honours Public Administration in the Second year will take the Honours First year in the Social Sciences (see page 68), or they may enter from the Pass Course if at least second class standing has been obtained. They are advised, however, to include Political Science 210 (Introduction to Political Science) in the First year, and by the end of that year should have a reading knowledge of French.

SECOND YEAR

1. Political Science 310, 315, or 335
2. Economics 210 (Principles) or, if already taken, an option
3. History 330 (Canada from 1791)
4. Political Science 360 (History of Political Thought)
5. An approved option

THIRD YEAR

1. Political Science 340 (Problems in Public Administration)
2. Political Science 320 (Canadian Federalism)
3. Public Law 310 (Elements) or Political Science 380
4. Economics 310 (Monetary Theory)
or Economics 315 (Economic History)
or Economics 360 (Economic Development of Canada)
or Economics 320 (Statistics)
5. An approved option

FOURTH YEAR

1. Political Science 365 (Modern Political Thought)
2. Political Science 525 (Government of Canada)
3. Political Science 390 (Research Tutorial)
4. Economics 440 (Public Finance)
Economics 450 (Economic Fluctuations and Stabilization Policy)
or Psychology 340 (Personnel Psychology I)
or Psychology 345 (Personnel Psychology II)
or Sociology 366 (Sociology of Work)
or Sociology 368 (Sociology of Power and Stratification)
5. An approved option

- *Certificate in Public Service Studies* (Offered in both day and evening divisions.)

This course is designed primarily for public employees who seek special training in public service subjects at the undergraduate level. Subjects taken for the Certificate may be credited toward a bachelor's degree, but a student must complete at least five of the subjects required for the degree *after* the award of the Certificate. Candidates for the Certificate, full-time, are invited to inquire about possible financial aid.

Admission Requirements

Junior matriculation (see p. 39); but the cases of experienced applicants without junior matriculation will be considered on their merits and the completion of certain subjects at Carleton may be required before admission. Candidates may be admitted with advanced standing, but must complete at least five courses for the Certificate in Carleton University.

Course Requirements

The following courses are required and the following order is suggested.

1. Political Science 210 (Introduction to Political Science)
2. Economics 210 (Principles of Economics)
3. History 330 (Canada from 1791)
or History 360 (The Economic Development of Canada)
4. Political Science 340 (Problems in Public Administration)
5. Political Science 320 (Canadian Federalism)
or Public Law 310 (Elements of Public Law)
6. One other, chosen in consultation with the Director according to the needs of the student.

Standing. A candidate for the Certificate must obtain a grade of "C" or better in at least half of the courses taken in Carleton University for the Certificate.

DISCONTINUED PROGRAMS:

Bachelor of Public Administration

Bachelor of Arts with Certificate in Public Administration

GRADUATE COURSES

- *Graduate Diploma in Public Administration* (Offered in both day and evening divisions)

This course is designed for those in or planning to enter the public service who already have a university degree, but desire further training in the fields directly related to public administration.

Admission Requirements

A. A bachelor's degree from a recognized college or university, including (with better than average standing) the following undergraduate courses, or their equivalents:

- a. Political Science 210 (Introduction to Political Science)
- b. Economics 210 (Principles of Economics)
- c. History 330 or 360 (Canadian History)
- d. Two other courses approved by the Director, in the social sciences or related fields. Experience in public service may be accepted in lieu of *one* of these two courses.

An applicant who lacks one or more of these prerequisite courses may be allowed to take one as No. 5 of the course requirements, and may make up the remainder of his deficiencies at the University. Ordinarily he would not be required to take more than two courses in addition to the requirements for the Diploma. A prospective full-time student with only one or two prerequisites to make up may take one of these during the summer prior to entry and/or may be permitted to take one as an additional course during his full-time year;

or

B. A bachelor's degree in any honours course requiring four years from senior matriculation, or a bachelor's degree and an additional year of post-graduate work with better than average standing. Students who have not obtained standing in Political Science 210, Economics 210, and History 330 or 360, or their equivalents, may be required to take one of these in addition to the requirements for the Diploma.

Course Requirements

Five courses are required:

1. Political Science 340 (Problems in Public Administration)
2. Political Science 360 or 365 (Political Thought)

3. Political Science 525 (Government of Canada)
or Political Science 550 (Provincial and Municipal Government)
4. Political Science 320 (Canadian Federalism)
or Public Law 310 (Elements)
or Public Law 510 (Administrative)
or Economics 440 (Public Finance)
or Economics 450 (Economic Fluctuations and Stabilization Policy)
5. An approved social science, preferably chosen from: Economics 320, 430, 440, 450, Public Law 310, 510, Sociology 364, 366, 368, Psychology 340, 345, or the courses in Political Science.

All five courses for the Diploma must be taken at the University. If a student has already taken any of these courses (or their equivalents) in qualifying for admission to the Diploma program, he must substitute others approved by the Director. To meet the needs of foreign students, variations from the course requirements may be approved by the Director.

Standing. Candidates for the Diploma must obtain an average of at least second class standing in the courses counted for the Diploma, with no grade below "C".

● *Master of Arts in Public Administration*

This program is normally offered in Day Division only, but it may be taken in Evening Division with the approval of the Director under the following conditions:

1. Admission under a or b (below).
2. Passing a comprehensive examination prior to the conferring of a degree.
3. Completing all requirements in a period not exceeding five years.
4. Having previously completed in B.A. or graduate program at least one year of university residence.

Admission Requirements

- a. A bachelor's degree, *and* the graduate Diploma in Public Administration with "B" or better grades in at least four courses;
or
- b. A bachelor's degree in any honours course requiring four years from Senior Matriculation with second-class honours or better, or a bachelor's degree and an additional year of post-graduate work with at least second class standing. If standing has not been

obtained in Introduction to Political Science, Economic Principles, Canadian History, Public Administration, and Political Theory, a student may be required to complete some or all of these courses with "B" or better grades, prior to undertaking the course requirements listed below. A prospective full-time student with only one or two prerequisite courses to make up, may take one of these during the summer prior to entry and/or may be permitted to audit or take one as an additional course during his full-time year.

If a student is without standing in all or most of these courses he will be required to register for the Graduate Diploma (see Diploma Admission Requirements, B.). An evening student may then, upon successful completion of three of the above courses with "B" or better grades, apply for admission to the M.A. program. (A full-time student in this category would be allowed to choose his Diploma courses so that one or two of them could count toward his M.A. Upon the successful completion of his full-time year, he could then either take the Diploma or apply for admission with advanced standing to the M.A. program, which could then be completed in the Evening Division.)

Course Requirements

1. Political Science 540 (Theory and Practice of Administration)
 2. Public Law 510 (Administrative). (This course must be elected if not previously taken.)
or Economics 450 (Economic Fluctuations and Stabilization Policy)
 3. Political Science 525 (Government of Canada)
or Political Science 550 (Provincial and Municipal Government)
 4. Political Science 590 (Directed Study in a Selected Field)
 5. and An approved social science
- } or a Thesis

Standing. A grade of "B" or better must be obtained in each course counted for the M.A. degree.

Admission Requirements

(a) *To the Qualifying University Year* of courses leading to the Bachelor of Science degree:

Requirements are the same as those for admission to the Bachelor of Arts degree (see page 39), or by Mature Matriculation as prescribed above (page 39).

(b) *To the First Year* of courses leading to the Bachelor of Science degree:

- (1) Successful completion of the Qualifying University Year with an average of "C" grade or better in the mathematics and science subjects taken.
- (2) The attainment of the Ontario Secondary School Honour Graduation Diploma (Senior Matriculation — Grade XIII) or an equivalent certificate, with an average of not less than 55% in the papers written, with at least third class honours in the Mathematics and Science subjects taken. Standing is required in the following:
 1. English Composition and Literature
 2. A language other than English
 3. Mathematics (Algebra, Geometry and Trigonometry)
 4. } Two of: Physics, Chemistry, Biology
 5. }

See also p. 32, *Credit for Senior Matriculation Subjects*.

(c) *To the Second or subsequent years* of courses leading to the Bachelor of Science degree:

Applications for admission to the Second or subsequent years will be evaluated on their merits and advanced standing granted for studies undertaken elsewhere only when these are recognized as the equivalent of subjects offered in Carleton University.

Every student will be required to complete at least his last five courses in Carleton University.

Course Requirements● *Bachelor of Science*

Length of course. Candidates for the B.Sc. pass degree will take a total of twenty courses after Junior Matriculation, or fifteen after Senior Matriculation. See also *Course Load*, p. 32.

Candidates for the B.Sc. Honours degree will take an additional year of study — see p. 67ff. and departmental announcements p. 75ff.

Course selection. The B.Sc. course affords opportunity to specialize in one science subject, called a *major*, and to a lesser extent in a second subject, called a *minor*. The choice of a major normally will be made before the student begins his Second year, in consultation with the department concerned.

Standards of Entry to a Major Subject: Students planning to major in a science subject will normally do so upon successful completion of the First year with an average standing of at least "C" grade in mathematics and science, and upon application to the chairman of the department of their choice.

Available Evening Courses. In several departments, most of the more advanced courses will normally be given, in whole or in part, in the day division only. Evening division candidates may therefore have to arrange to take certain of their major courses in the daytime. Candidates are advised to consult their major departments as early as possible to arrange their programs.

Subjects in which majors may be taken are: Biology (Botany, Zoology), Chemistry, Mathematics, Geology, Physics.

Courses will be selected from those listed under Details of Subjects, p. 75ff., as follows:

QUALIFYING UNIVERSITY YEAR

1. English 120
2. A language other than English (a course numbered between 100 and 199)¹
3. Mathematics 110, 111 and 112 or 116
4. {
5. { Two of: Biology 200, Chemistry 110, Physics 200, Geology 210

FIRST YEAR

1. One of: Classical Civilization 300 or 301, English 210, Philosophy 215
2. Mathematics 211 (or 200 with permission of major department)
3. { Three of:
4. { (a) Biology 200 or 210
5. { (b) Chemistry 110 or 210
- (c) Geology 210
- (d) Physics 200 or 205

¹ See also p. 32, *Substitution for Prescribed Subjects*.

SECOND AND THIRD YEARS

A total of ten courses, five in each year: normally at least four more courses in the student's major, at least two more in a minor field, and at least one course each year chosen from subjects other than the natural sciences and mathematics. The program of each student in the Second and Third years is under the direct supervision of a full-time member of the department in which he takes his major.

Language requirement. Before graduation, the candidate for the B.Sc. degree will be required to show that he has a reading knowledge of French, German, or Russian.

Proficiency in English. See p. 37.

Standing. General regulations regarding standing are stated on p. 33. In addition, a candidate for the B.Sc. degree must be recommended for graduation by his major department.

A student clearly below the required minimum standard at the end of his penultimate year prior to graduation may be required to withdraw from his major field by his department.

Honours Requirements in Science. (See p. 67ff., and departmental announcements, p. 75ff.)

SCHOOL OF ENGINEERING

DIRECTOR OF THE SCHOOL: John Ruptash, B.Sc., M.A.Sc., Ph.D.

ADVISORY COUNCIL

- B. G. Ballard, Vice-President (Scientific) and Director of Division of Radio and Electrical Engineering, National Research Council, Ottawa
 - L. F. Grant, Field Secretary, Engineering Institute of Canada, Toronto
 - D. C. MacPhail, Director of Division of Mechanical Engineering, National Research Council, Ottawa
 - J. H. Parkin, formerly Director, now Senior Consultant to Division of Mechanical Engineering, National Research Council, Ottawa
 - K. F. Tupper, Ewbank and Partners, Engineering Consultants, Toronto
 - G. R. Turner, formerly Chairman of Ottawa Branch, Engineering Institute of Canada
-

- A. Davidson Dunton, President of the University
- C. J. Mackenzie, President of the Atomic Energy Control Board, Chancellor of the University
- M. S. Macphail, Associate Dean, Faculty of Arts and Science
- E. W. R. Steacie, President of the National Research Council, Ottawa
- John Ruptash, Director of the School

● *Bachelor of Engineering* (offered in the Day Division only)

The first three years of the program of study in Engineering at Carleton University are devoted to the foundations of engineering: mathematics, physics, chemistry, and the engineering sciences. In the fourth year, four accredited options in the program of study are offered: civil engineering, electrical engineering, mechanical engineering, and engineering physics.

Graduates of Carleton University in Civil Engineering, Electrical Engineering, Mechanical Engineering and Engineering Physics are accepted for professional registration by the Association of Professional Engineers of the Province of Ontario.

Admission Requirements

Junior Matriculation—Junior matriculation requirements are the same as those for admission to the first year of courses leading to the Bachelor of Arts degree (see p. 39).

Senior Matriculation—In addition, a candidate for admission to the first year of the course leading to the Degree in Engineering must have passed the examinations of the Qualifying University Year of the Bachelor of Science course in Carleton University (see p. 58), or of Ontario Grade XIII or the equivalent examinations of other recognized examining bodies in the following subjects:

1. English Composition and Literature
2. Mathematics (Algebra, Geometry, including Analytic Geometry, and Trigonometry)
3. Physics
4. Chemistry
5. One of: Latin, Greek, French, German, Spanish, Italian, History, Biology (Botany and Zoology)

At least Second Class standing in Mathematics, Physics and Chemistry is required, in addition to the general university entrance requirement of an average of at least 55% in the papers written.

Course Requirements

Length of Course. Candidates for the Degree in Engineering will take a course covering four years of study after Senior Matriculation or after the first year of the B.Sc. course.

Course selection. Courses will be selected from those listed under Details of Subjects, p. 75ff., as follows:

FIRST YEAR

SUBJECT	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Chemistry 210 (Qualitative Analysis and Elementary Physical Chemistry).....	3	3	3	3
English 230 (English).....	2	2	—	—
Mathematics 211 (Calculus).....	4	4	—	—
Mathematics 247 (Geometry, Spherical Tri- gonometry and Algebra).....	3	—	—	—
Physics 205 (General Physics).....	3	3	3	3
Engineering 200 (Engineering Drawing)....	1	1	5	5
Engineering 205 (Surveying).....	—	2	—	—
Engineering 206 (Field Work in Surveying)...	—	—	—	—
Engineering 210 (Mechanics I).....	—	3	—	—
Engineering 270 (Introduction to Machine Tools).....	—	—	4	—
	16	18	15	11

SECOND YEAR

SUBJECT	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Chemistry 315 (Applied Physical Chemistry)	2	2	—	—
Geology 210 (General Geology).....	2	2	2	2
Mathematics 310 (Calculus and Differential Equations)	3	3	—	—
Physics 305 (Electricity and Magnetism and Modern Physics).....	3	3	3	3
Engineering 311 (Mechanics II).....	2	2	3/2	3/2
Engineering 320 (Mechanics of Materials I).....	2	2	3/2	3/2
Engineering 340 (Thermodynamics).....	2	2	3/2	3/2
Humanities or Social Sciences Elective.....	2	2	1	1
	18	18	10½	10½

THIRD YEAR

SUBJECT	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Mathematics 326 (Mathematical Methods).....	3	3	—	—
Engineering 411 (Mechanics of Machines and Mechanical Vibrations).....	2	2	3/2	3/2
Engineering 421 (Mechanics of Materials II).....	2	—	3	—
Engineering 427 (Metallurgy).....	2	2	3/2	3/2
Engineering 430 (Fluid Mechanics).....	2	2	3/2	3/2
Engineering 441 (Thermodynamics and Heat Transfer I).....	1	1	3/2	3/2
Engineering 450 (Fundamentals of Electric Circuits and Machines).....	3	3	3/2	3/2
Engineering 457 (Electronics I).....	—	3	—	3
Engineering 491 (Field Trip).....	—	—	—	—
Humanities or Social Sciences Elective.....	2	2	1	1
	17	18	11½	11½

FOURTH YEAR (CIVIL ENGINEERING OPTION)

SUBJECT	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Engineering 492 (Summer Essay).....	—	—	—	—
Engineering 495 (Engineering Seminar)....	1	1	—	—
Engineering 496 (Engineering Analysis)....	2	2	—	—
Engineering 497 (Engineering Project)....	—	—	5	5
Engineering 459 (Automatic Data Pro- cessing).....	—	2	—	3/2
Engineering 422 (Structural Analysis and Design).....	4	4	3	3
Engineering 423 (Reinforced Concrete)....	—	3	—	3
Engineering 424 (Soil Mechanics).....	3	—	3/2	—
Engineering 431 (Hydraulics).....	3	—	3/2	—
Basic Science or Engineering Elective.....	3	3	—	—
Humanities or Social Sciences Elective.....	2	2	1	1
	20	17	12	13½

FOURTH YEAR (ELECTRICAL ENGINEERING OPTION)

SUBJECT	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Engineering 492 (Summer Essay).....	—	—	—	—
Engineering 495 (Engineering Seminar)....	1	1	—	—
Engineering 496 (Engineering Analysis)....	2	2	—	—
Engineering 497 (Engineering Project)....	—	—	5	5
Engineering 459 (Automatic Data Processing).....	—	2	—	3/2
Engineering 451 (Circuit Analysis and Tran- sients).....	2	2	3/2	3/2
Engineering 453 (Electric Transmission)...	2	2	—	—
Engineering 454 (Electromagnetic Fields and Materials).....	—	2	—	3/2
Engineering 455 (Feedback Control Systems).....	3	—	3/2	—
Engineering 458 (Electronics II).....	2	2	3	3/2
Basic Science or Engineering Elective	3	3	—	—
Humanities or Social Science Elective.....	2	2	1	1
	17	18	12	12

FOURTH YEAR (MECHANICAL ENGINEERING OPTION)

SUBJECT	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Engineering 492 (Summer Essay).....	—	—	—	—
Engineering 495 (Engineering Seminar)....	1	1	—	—
Engineering 496 (Engineering Analysis)....	2	2	—	—
Engineering 497 (Engineering Project)....	—	—	5	5
Engineering 459 (Automatic Data Processing).....	—	2	—	3/2
Engineering 401 (Mechanical Analysis and Design).....	2	2	3	3
Engineering 432 (Fluid Dynamics).....	3	—	—	—
Engineering 442 (Thermodynamics and Heat Transfer II).....	2	2	3/2	3/2
Engineering 443 (Energy Conversion).....	—	3	—	3/2
Engineering 452 (Electrical and Electronic Measurements).....	2	—	3/2	—
Basic Science or Engineering Elective.....	3	3	—	—
Humanities or Social Sciences Elective.....	2	2	1	1
	17	17	12	13

FOURTH YEAR (ENGINEERING PHYSICS OPTION)

An outstanding student may be eligible for entrance to the fourth year option in Engineering Physics. The programs of study in the Engineering Physics Option consist of advanced courses in Mathematics, Physics, Chemistry and Engineering, selected to suit the special interest and aptitude of each student. The eligibility and selection of courses must be approved by the Engineering Physics Committee.

SUBJECT	Lecture Hours Per Week		Laboratory and Problem Analysis Hours per Week	
	First Term	Second Term	First Term	Second Term
Engineering 492 (Summer Essay).....	—	—	—	—
Engineering 495 (Engineering Seminar)....	1	1	—	—
Chemistry Elective.....	0/3	0/3	—	—
Mathematics Electives.....	3/6	3/6	—	—
Physics Electives.....	3/6	3/6	0/3	0/3
Engineering Electives.....	6/9	6/9	3/6	3/6
Humanities or Social Science Elective.....	2	2	1	1
	18	18	7	7

Standing. General regulations regarding standing are stated on p. 33.

Regulations regarding Failure in Engineering. An Engineering student who fails a number of subjects may be deemed to have failed his year, and denied the privilege of writing supplemental examinations. He may apply to the Committee on Admission and Studies for permission to repeat the year, on probation.

An Engineering student who fails some subjects and is permitted to write supplemental examinations may not enter the following year if, after the supplemental examinations, he is still conditioned in more than one full course, or if he is conditioned in any course which is prerequisite to one of the courses in the following year.

If a student fails both the regular and supplemental examinations in a subject, he must repeat that or an equivalent course before taking another examination in it.

Employment. Students in Engineering are required to have at least six months of suitable experience in technical work before receiving their degree. Evidence of summer employment must be submitted in forms, obtainable at the Registrar's Office, not later than October 31.

● *Graduate Studies*

The School of Engineering offers graduate courses leading to a Master's degree in the fields of Aeronautical Engineering and Electrical Engineering. Further information regarding the graduate study programs can be obtained from the School of Engineering.

HONOURS COURSES

General Regulations

The degrees of Bachelor of Arts with Honours and Bachelor of Science with Honours are designed for students who contemplate further studies at the graduate level or who desire to obtain a specialist certification for teaching in Ontario or other secondary schools. Courses leading to honours follow a detailed prescription of studies and require sustained high standards of achievement and penetration. The student in honours will be expected to show that he can work independently as well as in small groups, and he will have opportunities to read widely beyond as well as within the confines of his particular field of honours study.

The chairman of the department in which the candidate chooses his major subject or field of study will discuss and approve the course at each stage of progress.

Additional Admission Requirements

Admission to Honours will be granted only with the consent of the department in which the major subject is taken. Normally students who have attained second class standing in the work of the First Year and a grade of 'B' or better in the Honours subject, may be admitted to the Second year of an Honours course.

Students with at least a 75% average in Senior matriculation or a 2.4 standing in the Carleton qualifying university year, and a grade of 'B' or better in the Honours subject, may be enrolled in Honours in the First year. Such students may take six courses as prescribed under the separate Divisions below.

Length of Course

Candidates for a degree with Honours will ordinarily take 25 courses in five years if admitted by Junior matriculation, or twenty courses in four years if admitted by Senior matriculation. With the permission of the department or departments concerned, it is possible for a candidate of exceptional ability to complete an Honours program in certain fields in three years from Senior matriculation by taking six courses in each winter session and one in each of the summers (if necessary, completing a graduation essay or thesis where required in the summer of the graduating year).

Course Selection

A candidate for Honours must choose a major subject or an approved combination of subjects, normally before entry to the Second year. Details of Honours courses may be found below under the respective departmental programs. Students wishing to qualify for entry to the Ontario

College of Education in the course leading to the High School Assistant's Certificate Type A should consult the Registrar and the appropriate departments regarding course selection.

Standing

General regulations regarding standing are stated on p. 33. Additional regulations regarding the standing of candidates for an Honours degree are as follows:

To receive credit towards an Honours degree, a candidate must maintain at least 'B' standing or the equivalent in the Honours and allied subjects. No student enrolled in an Honours course is permitted more than three supplemental examinations for any purpose during his Honours course.

A student who fails to maintain honours standing in any year must withdraw from Honours. Such a student may apply for admission to the Pass course.

At graduation a student's honours standing is determined, on the basis of his entire record, and also upon the Department's recommendation, as First Class, High Second Class, or Second Class.

Programs of Study

(a) Honours Programs in the Humanities

At present Honours are available in Classics, English, French, German, and Philosophy. Certain programs of combined Honours may be arranged by permission of the departments concerned.

Students may enter Honours in the Humanities at the beginning of First year, or by transfer from the Pass course if second class standing has been obtained. The First year Honours prescription consists of the present First year of the Pass Arts course, with the option of a sixth course to be chosen in consultation with the department concerned.

(b) Honours Programs in the Social Sciences

At present Honours are available in Economics, History, Political Science, Public Administration, and Sociology. Combined honours in Economics and Political Science and in History and Political Science are also available.

Students may enter Honours in the Social Sciences at the beginning of First year, or by transfer from the Pass course if second class standing has been obtained. The course pattern for entrance into First Year Honours in the Social Sciences is as follows:

- 4 of: Economics 210
History 220
Political Science 210
Psychology 210
Sociology 210
- 1 of: English 210 } both to be taken
Philosophy 215 } before graduation
- 1 of: A First year language course } two to be taken
A First year science course } before graduation,
A First year mathematics course } one of which
must be a science

(c) *Honours Programs in the Natural and Physical Sciences*

At present Honours are available in Biology, Chemistry, Geology, Mathematics, Physics, Mathematics and Physics, and Applied Physics.

Students may enter Honours in Science from Senior Matriculation or by transfer from the Pass course if second class standing has been obtained. The first year of the Honours science program consists of the present First year of Pass Science with the option of a sixth course to be chosen in consultation with the major department.

SCHOOL OF GRADUATE STUDIES

DIRECTOR OF THE SCHOOL:

M. S. MACPHAIL, M.A., D.PHIL., F.R.S.C.

Courses leading to graduate degrees are offered in the following: Biology, Canadian Studies, Chemistry, Economics, Engineering (aeronautical and electrical), English, French, Geology, History, Mathematics, Physics, Political Science, Public Administration, Psychology, Sociology.

Each candidate will be under the direction of a department, institute, or school, and must comply with any special conditions prescribed. Graduate students are under the general regulations of the University, and also those stated below. Candidates are advised that the number of places is limited, and even if their qualifications are satisfactory, it may not be possible to admit them. If the candidate's application is received by April 1, every effort will be made to inform him as to acceptance by May 1.

A candidate who wishes to graduate at the May convocation must submit his thesis (where applicable) by April 1.

Master of Arts, and Master of Science

Admission Requirements

Candidates must have a bachelor's degree with at least second class standing for admission. Those with pass degrees will normally require the equivalent of two years' full-time study, while those with honours degrees will normally require the equivalent of one year's full-time study. Candidates may be required to make up deficiencies in their background. A grade of B or better must be obtained in each course counted for credit towards the degree of M.A. or M.Sc.

Course Requirements

The normal requirement for the final year of the Master's degree will be five courses or the equivalent. Directed special studies may be counted as one course, while a substantial thesis based on the student's own research may be counted as two courses. Some courses may be selected from those open to undergraduates (300-499), but when such a course is taken for graduate credit the completion of additional assignments may be required. At least three courses (including the thesis) must be selected from those numbered 500-599.

Examinations

In addition to the usual examinations in individual courses, each candidate will be required to take either an oral examination on his thesis

or a comprehensive examination on his field. At the direction of his department, both examinations may be required, or they may be combined. Departments may also require examinations in languages other than English.

Time Limitation

A candidate who fails to complete the requirements for the degree within five years from the date of his admission into the final year must, if he wishes to continue, apply for extension of time.

Thesis

Students must provide four typewritten copies (original and three carbons), or acceptable duplicated copies, on a suitable grade of paper, 8½ by 11 inches. The thesis must be typed double-space, in a standard type-face, on one side of the paper, with at least 1½ inch margin at the left. Bibliographies, diagrams, and so forth, are to be prepared as directed by the department. A suitable abstract is to be provided. The original copy should be presented in an envelope, unbound in order of pagination, and the copies in spring binders, with the pages not mutilated in any way. The candidate gives the University the right to microfilm, photostat, and circulate the thesis and abstract, as may be required.

Doctor of Philosophy

Admission Requirements

Candidates will ordinarily have already taken the degree of M.A. or M.Sc.

Course and Thesis Requirements

The period of formal study and research required in the Ph.D. program will be at least two years of full-time study, or the equivalent, beyond the M.A. or M.Sc. qualification. The thesis will ordinarily carry a weight of about one half of the total requirement. The thesis must be a contribution to knowledge, and must demonstrate the candidate's capacity to undertake sustained research and to report the results in a fashion appropriate to the subject matter. The regulations stated above for the Master's thesis also apply.

Examinations

- (a) A qualifying examination may be set at the beginning of the course.
- (b) A comprehensive examination covering prescribed fields will be set, ordinarily one year before the thesis is to be presented. This

examination, which may be oral or written, or both, may include any work fundamental to a proper comprehension of the major subject.

- (c) After the thesis has been received and approved, a final oral examination on the subject of the thesis and related fields will be held.
- (d) Before the comprehensive examination (b), every candidate must satisfy the major department that he has a reading knowledge of two languages other than English, one of which must be French or German.

Time Limitation

A candidate who fails to complete the thesis within five years after the comprehensive examination must, if he wishes to continue, apply for extension of time.

Graduate Fees

Full-time—M.A.	Qualifying year	Same as undergraduates (see p. 30)
M.A.	With honours standing, or after qualifying year	\$350
M.A.	For second year, if necessary	250
Ph.D.	First year	350
Ph.D.	Second year	350
Ph.D.	Third year, if necessary	250
Ph.D.	For residence thereafter, per year	100
Ph.D.	For non-residence, to keep name on books, per year	25
Part-time —	Per course	Same as undergraduate

THE INSTITUTE OF CANADIAN STUDIES

Committee of Management

1961-62

Chairman: A. D. DUNTON, LL.D., D.SC., President of the University

Director: ROBERT L. MCDUGALL, M.A., PH.D.

Members: JAMES A. GIBSON, (Dean of the Faculty of Arts and Science), MUNRO BEATTIE (English), WILFRID EGGLESTON (Journalism), DAVID M. L. FARR (History), JAMES S. TASSIE (French), MUNI C. FRUMHARTZ (Sociology), DOUGLAS G. ANGLIN (Political Science), H. EDWARD ENGLISH (Economics), GORDON C. MERRILL (Geography).

The Institute of Canadian Studies co-ordinates the resources of eight departments in the humanities and social sciences in the promotion of scholarship in the cultural history of Canada. Within this framework its character is determined by two assumptions: first, that the graduate student who has a special interest in Canadian studies can benefit from a broader approach to these studies than he is likely to make if he commits himself to the course and thesis requirements of a single department; second, that Canadian studies should be developed in a context that reflects the cosmopolitan origins of the country's traditions and an international rather than a strictly national outlook. In keeping with these assumptions the Institute offers the graduate student access to a program of interdisciplinary research and instruction in Canadian subjects, and at the same time sponsors studies in relations between Canada and the parent countries of Great Britain and France, between Canada and the United States, and between Canada and other members of the Commonwealth. The proximity of Carleton University to the National Library, the Library of Parliament, the Public Archives of Canada, the Dominion Bureau of Statistics, and the libraries of government departments and embassies ensures excellent facilities for research in the fields of study with which the Institute is concerned.

Degree of Master of Arts

General regulations governing admission to studies for the Master of Arts degree (p. 70) will apply. The diversified nature of the Institute's program, however, makes necessary two special regulations:

1. Students registering for graduate courses in disciplines in which they have had little or no undergraduate training may be required to undertake preliminary work in these fields.

2. A reading knowledge of French is a prerequisite for all graduate courses given by the Institute.

The length of the M.A. program in the Institute of Canadian Studies will normally be two years.

Courses

Three of the courses listed below, together with a thesis, oral and written examinations on a comprehensive list of Canadian books, and such preliminary courses as may be called for, complete the requirements for the Master of Arts degree in the Institute of Canadian Studies.

<i>Self-Government in Canada, 1867-1945</i> (CS 1)	Department of History
<i>Concepts of Empire, 1783-1931</i> (CS 6)	Department of History
<i>The Canadian Novel</i> (CS 10) (half course in the first term)	Department of English
<i>Le roman canadien de langue française</i> (CS 20) (half course in the second term of the same year as CS 10. Concluding four seminars to be held jointly with CS 10)	Department of French
<i>Canadian Poetry</i> (CS 11) (half course in the first term in alternate years with CS 10)	Department of English
<i>La poésie canadienne de langue française</i> (CS 21) (half course in the second term of the same year as CS 11. Concluding four seminars to be held jointly with CS 11)	Department of French
<i>The Press in Canadian Society</i> (CS 30)	Department of Journalism
<i>The Political Process and its Application in Canada</i> (CS 46)	Department of Political Science
<i>Canadian External Relations</i> (CS 47)	Department of Political Science
<i>Canadian Social Structure and Institutions</i> (CS 60))	Department of Sociology
<i>Comparative Studies in the Literary Cultures of Canada and the United States</i> (CS 110)	Department of English
<i>Comparative Studies in the Literary Cultures of Canada and Australia</i> (CS 111)	Department of English

Forms for admission to graduate studies may be obtained from the Registrar, Carleton University.

Applications for admission to the M.A. program of the Institute of Canadian Studies should be sent to the Director of the Institute. The closing date for applications for University Fellowships (see page 177) is March 15.

DETAILS OF SUBJECTS

The course numbering pattern is, in general, as follows:

- 50-99 Preparatory courses (no longer offered)
- 100-199 Courses usually taken in the Qualifying University year
- 200-299 Courses usually taken in the First year
- 300-399 Courses open to senior undergraduates or graduate students
- 500-599 Courses open to graduate students **only**.

Former course numbers are indicated in square brackets.

A listing of discontinued courses is available upon request to the Office of the Registrar, Carleton University.

ACCOUNTING

Sessional Lecturers A. A. Sterns, Lic.com., Dr. rer. pol.
C. N. Brennan, B.Com., M.S., C.A.
N. R. Brining, B.Com., C.A.
Albert B. Larose, B.Com., C.A.

Students who, after achieving the B.Com. degree, intend to proceed to professional accounting degrees—Chartered Accountant (C.A.), Certified Public Accountant (C.P.A.), Certified General Accountant (C.G.A.), or Registered Industrial and Cost Accountant (R.I.A.)—should consult the Chairman of the Department of Economics before entering the final year of the Commerce course.

Other enquiries about Accounting courses should also be directed to the Chairman of the Department of Economics.

ACCOUNTING 210. [2]. *Elementary Accounting*

The theory and practice of accounts, including the purposes of the double entry analysis of transactions; the establishment of financial classifications through the medium of books of original entry and the ledgers; the preparation of periodic financial statements and a study of the accounting entries required for that purpose; an introduction to the concepts of costs and of revenues and to the problems of effecting a periodic matching in the accounts; partnership and corporation accounting.

Day Division: Annually (lectures two hours a week; weekly problem periods).

Evening Division: Annually (lectures two hours a week; occasional problem periods).

ACCOUNTING 310. [3, 100]. *Intermediate Accounting*

The theory and practice of accounts with particular attention to the corporate form of business organization; accounting application of legal and policy considerations regarding capital stock, retained earnings and appropriations thereof, bonds and other liabilities; problems in the valuation of inventories, investments, plant and equipment and other assets; present status of accounting standards and terminology, with particular reference to the preparation of financial statements; techniques employed in the analysis and interpretation of accounting data.

PREREQUISITE: Accounting 210.

Day Division: Not offered, 1961-62.

Evening Division: Annually (lectures 2 hours a week, occasional problem periods).

ACCOUNTING 320. [4, 101]. *Advanced Accounting*

A further study in the development of the accounting theory underlying corporate financial statements, the limitations of the financial statements and the need for other classifications of accounting data particularly in managerial control; the role of the internal and external auditor as a function of control. An introduction to the problems involved in the financing of a business enterprise.

PREREQUISITE: Accounting 310.

Day Division: Not offered, 1961-62.

Evening Division: 1961-62 (lectures and case discussions two hours a week).

ACCOUNTING 345. [7]. *Cost Accounting*

The field of cost accounting, including a study of the elements of costs; analysis of types of costs; distribution of cost elements to units of production in job cost systems and process cost systems; cursory treatment of estimated and standard cost systems.

PREREQUISITE: Accounting 310.

Evening Division: Annually (lectures two hours a week, occasional problem periods).

ACCOUNTING 380. [5, 102]. *Government Accounting and Finance*

A study of the financial administration and organization of the Canadian Government, including the preparation, legalization, and execution of the budget; the authorization and collection of revenues; government borrowing and public debt; parliamentary appropriations; the disbursement of public monies; the audit of the public accounts; the financial functions of Parliament; the Committees of Supply and Ways and Means; the Governor in Council; the Treasury Board; the Receiver General and Minister of Finance; the Department of Finance and the Comptroller of the Treasury; the Bank of Canada; the Auditor General; and the Public Accounts Committee. The course will include some reference to the financial administrative practices of other countries.

PREREQUISITE: Accounting 210.

Not offered 1961-62.

BIOLOGY

Professor; Chairman of the Department, 1961-62

H. H. J. Nesbitt, M.A., Ph.D., D.Sc., F.L.S., F.R.E.S., F.Z.S.

Associate Professor (Botany) Frank Wightman, B.Sc., Ph.D.

Associate Professor (Botany) W. I. Illman, B.A., M.Sc., Ph.D.

Assistant Professor (Zoology) Donald A. Smith, M.A., Ph.D.

Lecturer, and Curator of the Herbarium Isabel L. Bayly, B.Sc., M.A.

Sessional Lecturers V. E. F. Solman, M.A., Ph.D.

J. S. Tener, M.A., Ph.D.

Demonstrators C. W. Leggatt, B.S.A., M.Sc., Ph.D., F.A.I.C.

Barbara Gordon, B.A.

Teaching Fellows Magdalena K. P. Meyer, D.Sc.

Hugh J. Hope, B.Sc.

The presence in Ottawa of many of Canada's leading research laboratories, the national botanical and zoological collections, and large libraries, and the frequent visits to Ottawa by eminent scientists from other centres, make Carleton an ideal place for the study of the life sciences.

UNDERGRADUATE PROGRAMS

Candidates who intend to read for Honours or Pass degrees in the Biological Sciences will find the course programs outlined below. All must pass a comprehensive examination at the conclusion of their period of study, have a reading knowledge of French, German, or Russian, and attend a seven-day field course arranged by the Department at the beginning of their third or fourth year.

PASS DEGREE PROGRAMS

Students who are reading for a Pass Bachelor of Science degree in the Biological Sciences must take seven and one half courses in Biology. These are to be arranged in one of the following patterns, each of which must also include a half course in Ecology in either Year II or Year III.

Pattern 1. *Pass B.Sc. in General Biology*

Year I: Biology 210; Chemistry 210; *either* Physics 205 *or* Geology 210; Mathematics 211; and *either* English 210 *or* Philosophy 215.

Year II: Biology 340; *either* Botany 310 *or* 330/332; *either* Zoology 305 *or* 315; a second course in the minor science; *either* English 210 *or* Philosophy 215 (whichever was not taken in Year I).

Year III: Biology 310; the two alternative Botany and Zoology courses not taken in Year II; a third course in the minor science; and an optional non-mathematics, non-science course.

Pattern 2. *Pass B.Sc. in Botany or Zoology*

Years I and II: As in Pattern 1 above.

Year III: Biology 310; *either* two further courses in Botany *or* two further courses in Zoology (*one* of these courses must be chosen from the alternative courses not taken in Year II); a third course in the minor science; and an optional non-mathematics, non-science course.

Pattern 3. *Pass B.Sc. in Experimental Biology*

Year I: As in Pattern 1 above, but Physics 205 must be taken.

Year II: As in Pattern 1 above, but the second course in the minor shall be Chemistry 320.

Year III: Biology 310; *one* of the alternative courses in Botany *or* Zoology not taken in Year II; *either* Biology 430 *or* 450, with the permission of the Department; a third course in Chemistry; and an optional non-mathematics, non-science course.

Students who wish to read for a Pass B.A. in the Biological Sciences must consult the Department to arrange their course programs.

HONOURS DEGREE PROGRAMS

Students who are reading for an Honours Bachelor of Science degree in the Biological Sciences must take one of the following course patterns, and include a half course in Ecology in either Year III or Year IV.

Pattern A. *B.Sc. with Honours in General Biology, Botany or Zoology*

Year I: Biology 210; Chemistry 210; Physics 205; Mathematics 211; and *either* English 210 *or* Philosophy 215

Year II: Biology 340; *either* Botany 310 *or* 330/332; *either* Zoology 305 *or* 315; a second course in *either* Chemistry *or* Physics, to be chosen in consultation with the Department; and *either* English 210 *or* Philosophy 215 (whichever was not taken in Year I).

Year III: Biology 310; the two alternative Botany and Zoology courses not taken in Year II; a third course in the Physical Science option chosen in Year II; and a non-science option.

Year IV: Biology 475 and four additional Honours courses, to be chosen in consultation with the Department.

Pattern B. *B.Sc. with Honours in Biology and Chemistry for Experimental Biologists*

Year I: As in Pattern A above.

Year II: Biology 340; *one* of Botany 310 *or* 330/332, *or* Zoology 305 *or* 315; Chemistry 320; *either* Physics 304 *or* 305; *either* English 210 *or* Philosophy 215 (whichever was not taken in Year I).

Year III: Biology 310; *two* of Botany 310 *or* 330/332 *or* Zoology 305 *or* 315, excluding the option taken in Year II; a third course in Chemistry; and a non-science option.

Year IV: Biology 450; Biology 475; and three additional Honours courses chosen in consultation with the Department.

Students wishing to obtain the Ontario College of Education Interim High School Assistant's Certificate, Type A, must include in year IV, in addition to the courses already listed, the Botany or Zoology option listed in Years II and III not already taken, a fourth course in Chemistry and a course in the Humanities or the Social Sciences.

For further information about admission to the Ontario College of Education Interim High School Assistant's Certificate, Type A, students are invited to consult the Registrar.

DESCRIPTION OF COURSES

BIOLOGY 200. *Concepts and Methods in the Biological Sciences*

A course designed to illustrate the fundamental principles governing organic processes (animal and plant), the development and relationship of organisms, and the position of man in the organic world. This course is primarily intended for persons who do not intend to take further courses in Biology.

TEXT: Villee, *Biology* (Saunders).

Day Division: Annually (lectures three hours a week, laboratory three hours a week).

Professors Nesbitt and Wightman, and Mrs. Bayly

BIOLOGY 210. *General Biology*

An introductory lecture and laboratory course on the fundamental principles of biology.

TEXT: To be announced.

Day Division: Annually (lectures three hours a week, laboratory four hours a week).

Professors Nesbitt and Illman

BIOLOGY 310.[5]. *Genetics*

A lecture and laboratory course to illustrate the fundamental principles of inheritance in animals and plants. In addition to his general laboratory work, the student will undertake an individual project.

TEXTS: Srb and Owen, *General Genetics* (Freeman).

Sinnott, Dunn and Dobzhansky, *Principles of Genetics* (McGraw-Hill).

PREREQUISITES: Biology 210 and 340.

Day Division: Annually (seminar or lecture two hours a week, laboratory four hours a week).

Mrs. Bayly

BIOLOGY 340. *Plant and Animal Physiology*

A lecture and laboratory course on the fundamental principles of plant and animal physiology.

TEXTS: Bonner and Galston, *Principles of Plant Physiology* (Freeman).

Meyer, Anderson and Bohning, *Introduction to Plant Physiology* (Van Nostrand).

Yapp, *An Introduction to Animal Physiology* (Oxford).

PREREQUISITES: Biology 210 and Chemistry 210.

Day Division: Annually (lectures three hours a week, laboratory four hours a week).

Professors Wightman and Smith

BIOLOGY 360. *Ecology*

A half course of lectures and seminars in general ecology.

PREREQUISITE: Biology 210.

Evening Division: 1961-62 (one two-hour seminar a week).

Dr. Solman

BOTANY 310. *Comparative Anatomy and Morphology of the Vascular Plants*

A course on the detailed developmental anatomy of higher plants and their historical evolution.

TEXTS: Foster and Gifford, *Comparative Morphology of the Vascular Plants* (Freeman).

Anatomy text to be announced.

PREREQUISITE: Biology 210.

Day Division: 1961-62 (lectures two hours a week, laboratory four hours a week).

Mrs. Bayly

BOTANY 330.[3]. *Cryptogamic Botany (Algae)*

A half course on the morphology, reproduction, and evolution of the algae.

PREREQUISITE: Biology 210.

Not offered 1961-62.

BOTANY 332. *Cryptogamic Botany (Fungi)*

A half course on the morphology, reproduction, and evolution of the fungi.

PREREQUISITE: Biology 210.

Not offered 1961-62.

BOTANY 334. *Cryptogamic Botany (Bryophytes)*

A half course on the morphology, reproduction, and evolution of the mosses and liverworts.

PREREQUISITE: Biology 210.

Evening Division: 1961-62 (lectures two hours a week, laboratory four hours a week, first term).

BOTANY 350. See Biology 340.

ZOOLOGY 305. *Invertebrate Zoology*

A lecture and laboratory course on the comparative anatomy, development, classification and evolution of the invertebrate animals.

TEXT: Borradaile, Eastham, Potts and Saunders, *The Invertebrata* (Cambridge).

REFERENCE TEXTS: Brown, *Selected Invertebrate Types* (Wiley).

Parker & Haswell, *Text-book of Zoology*, Vol. I (Macmillan).

Bullough, *Practical Invertebrate Anatomy* (Macmillan).

PREREQUISITE: Biology 210.

Day Division: 1961-62 (lectures three hours a week, laboratory four hours a week).

Professor Nesbitt

ZOOLOGY 315. *Chordate Zoology*

A lecture and laboratory course on the comparative anatomy, development, classification and evolution of the chordates.

PREREQUISITE: Biology 210.

Day Division: 1961-62 and alternate years (lectures three hours a week, laboratory four hours a week).

Professor Smith

ZOOLOGY 350. See Biology 340.

HONOURS COURSES

BIOLOGY 430. [15]. *General Microbiology*

The general principles and practice of microbiology. Consideration will be given to the biologic, economic, ecologic, and industrial importance and to the metabolic processes and the taxonomy of autotrophic, saprobic, and parasitic bacteria, yeasts, moulds and actinomycetes.

PREREQUISITES: Biology 210 and 340, and Chemistry 320.

Day Division: Not offered, 1961-62.

BIOLOGY 450. *Cellular Physiology and Biochemistry*

A lecture and laboratory course on the comparative physiology and biochemistry of plant and animal cells.

TEXTS: Giese, *Cell Physiology* (Saunders)

Fruton and Simmonds, *General Biochemistry* (Wiley)

PREREQUISITES: Biology 210 and 340, and Chemistry 320.

Not offered, 1961-62.

BIOLOGY 475. [20]. *History of Biology*

A seminar course on the history of biology and biological theory.

REFERENCE TEXTS: Nordenskiöld, *The History of Biology* (Knopf).

Huxley, *Evolution, the Modern Synthesis* (Harpers).

Woodger, *Biological Principles* (Keegan-Paul).

Bertalanffy and Woodger, *Modern Theories of Development* (Oxford).

Darwin, *Origin of Species* (Everyman's)

Sullivan, *The Limitations of Science* (New American Library).

PREREQUISITES: Biology 310 and 340.

Not offered, 1961-62.

BIOLOGY 490. *Research Project and Seminar*

Students reading for an Honours degree in Biology may do a research project under the direction of one of the members of the Department. Seminars will be held at which Honour students will present reports on recent progress in selected fields of biology. The attendance at such seminars and at other similar meetings at research institutions in Ottawa will bring the student into close contact with specific problems in current fields of biological research.

Day Division: Annually (laboratory hours and seminar periods to be arranged).

Members of the Department

BOTANY 420. [6]. *Taxonomy of the Flowering Plants*

A general survey of the flowering plants, the bases for classification, and the history of taxonomy. A project will be assigned.

TEXT: Lawrence, *Taxonomy of Vascular Plants* (Macmillan).

PREREQUISITE: Botany 310.

Not offered, 1961-62.

BOTANY 424. *Field Taxonomy*

Though this course will be primarily concerned with field taxonomy and related laboratory work, there will be seminars and lectures on selected groups. Ecological associations will be considered and collections will be made. (Half course).

PREREQUISITE: Botany 420.

Not offered, 1961-62.

BOTANY 428. *Project in Taxonomy*

A seminar and reading course, including the preparation of a paper on an assigned project. (Half course).

PREREQUISITE: Botany 420. (Botany 424 should be taken concurrently).

Not offered, 1961-62.

ZOOLOGY 455. *Histology and Embryology*

A lecture and laboratory course on the fundamental principles of the histology and embryology of vertebrates.

PREREQUISITE: Zoology 315.

Not offered, 1961-62.

ZOOLOGY 460. [5, Biology 7]. *Entomology*

A course on the morphology and physiology of representatives of the more important orders and families of insects.

REFERENCE TEXTS: Snodgrass, *Principles of Insect Morphology* (McGraw-Hill).
Wigglesworth, *Insect Physiology* (Methuen).

PREREQUISITE: Zoology 305.

Day Division: 1961-62.

Professor Nesbitt

ZOOLOGY 480. *Taxonomy of the Vertebrates*

A lecture, seminar and laboratory course on the classification, evolution and geographic distribution of the major groups of vertebrates.

PREREQUISITE: Zoology 315.

Day Division: 1961-62.

Professor Smith

ZOOLOGY 485. *Principles of Systematic Zoology*

A course devoted to an intensive study of the principles and methods of animal classification.

PREREQUISITE: Permission of the Department.

Not offered, 1961-62.

GRADUATE STUDIES

The Department of Biology will welcome graduate students of the necessary competence in the following fields of study: Entomology including Acarology, Mammalogy, Mycology and Plant Pathology, Plant Physiology, Plant Systematics, Plant Anatomy, and Wildlife Biology.

GRADUATE COURSES

BIOLOGY 500. *Advanced Genetics*

A seminar and problem course in the principles and practice of modern genetic theory.

PREREQUISITES: Biology 310 and a course in statistics.

Professor Illman

BIOLOGY 510. *Advanced Ecology*

An advanced course in ecology.

Dr. Solman

BOTANY 500. *Mycology*

An advanced course devoted to the morphology, reproduction, taxonomy, and evolution of the fungi.

PREREQUISITE: Botany 332.

Professor Illman

BOTANY 510. *Plant Physiology*

An advanced course in plant physiology.

PREREQUISITE: Biology 450.

Professor Wightman

BOTANY 520. *Plant Biochemistry*

An advanced course in plant biochemistry.

PREREQUISITE: Biology 450.

Professor Wightman

ZOOLOGY 510. *Acarology*

An advanced course devoted to the Acari (mites).

PREREQUISITE: Zoology 460.

Professor Nesbitt

ZOOLOGY 520. *Advanced Entomology I*

A course devoted to an advanced study of insect morphology and phylogeny.

PREREQUISITE: Zoology 460.

Professor Nesbitt

ZOOLOGY 525. *Advanced Entomology II*

A course devoted to an advanced study of insect taxonomy.

PREREQUISITE: Zoology 460.

Professor Nesbitt

ZOOLOGY 530. *Advanced Entomology III*

A course devoted to an advanced study of insect physiology.

PREREQUISITES: Biology 340 and Zoology 460.

ZOOLOGY 540. *Mammalogy*

A seminar and laboratory course on the taxonomy, distribution, and ecology of mammals.

PREREQUISITES: Zoology 480 and Biology 360.

Professor Smith

CHEMISTRY

<i>Professor; Chairman of the Department, 1961-62</i>	J. M. Holmes, B.Sc., M.A., Ph.D.
<i>Professor</i>	J. M. Morton, M.Sc., M.A., Ph.D., F.C.I.C.
<i>Associate Professor</i>	P. M. Laughton, B.A., M.Sc., Ph.D.
<i>Assistant Professors</i>	D. R. Wiles, B.Sc., B.Ed., M.Sc., Ph.D.
	A. G. Forman, B.A., M.Sc. (on leave of absence, 1961-62)
	E. A. Cherniak, M.A., Ph.D.
<i>Senior Demonstrator</i>	R. T. Elworthy, M.B.E., B.Sc., Ph.D.

PASS COURSE

A pass course student majoring in Chemistry should have completed Chemistry 110 and 210 before entry to the Second year. It is recommended that Physics 205 and Mathematics 211 be taken in First year and Physics 305 and Mathematics 310 in Second year. At least four Chemistry courses beyond Chemistry 210 are required, including Chemistry 310 and 320 in the Second year and 330 in the Third year.

HONOURS COURSES

An Honours degree is the normal requirement for admission to graduate work or professional standing in Chemistry.

General regulations concerning admission, standards, and length of course are found on pp. 67-9 of the calendar. Normally students enter the Honours program in Chemistry in their Second year. In exceptional circumstances, a candidate may enter Honours directly from high school in the First year and proceed in the manner outlined in the general regulations.

The Qualifying University and First years are those of the pass science course, including Chemistry 210, Mathematics 211, and Physics 205. At least 16 courses are required beyond the First year, including the following:

1. At least eight courses in Chemistry, including Chemistry 310, 320, 330, 340, 350, 360, 490, and one of 410, 420, 440, and 460.
2. Mathematics 310.
3. Physics 304 and 305.
4. Further supporting science and Mathematics courses.
5. Two additional non-science, non-Mathematics courses normally including one in a language other than English.

In consultation with the Department, options may be chosen which will satisfy the requirements for admission to the Ontario College of Education for the High School Assistants' Certificate, Type A, either in Science or in Physics and Chemistry.

Each candidate for Honours in Chemistry is required as part of Chemistry 490 in the final year to solve a research problem and write a thesis. Four typewritten copies of this thesis are to be deposited with the Chemistry Department not later than April 15, of which one copy may be returned to the candidate. Each candidate is also required to demonstrate a reading knowledge of two of scientific French, German, and Russian.

GRADUATE STUDIES

Graduate studies at M.Sc. and Ph.D. levels are offered in the department in the fields of organic chemistry, physical chemistry, and inorganic and radio-chemistry. Normally graduate work in Chemistry must be conducted full time in residence and research must be done in the department's laboratories under supervision of the staff.

In addition to the general requirements, candidates for the M.Sc. in Chemistry are required to pass a comprehensive examination, and to demonstrate a reading knowledge of two of scientific French, German, and Russian.

CHEMISTRY 110. *Introductory Chemistry*

An introductory course emphasizing the fundamental laws and principles of chemistry. The more important metals and non-metals and their compounds are studied.

TEXTS: Ritter, *An Introduction to Chemistry* (J. Wiley, 1955).

Malm and Frantz, *College Chemistry in the Laboratory 2* (W. H. Freeman and Co., 1954).

Pierce and Smith, *General Chemistry Workbook* (W. H. Freeman and Co., 1958).

Day Division: 1961-62 (lectures three hours a week, laboratory three hours a week).

Evening Division: Not offered, 1961-62.

Professor Morton

CHEMISTRY 210. *General Chemistry*

A study of the chemical behaviour of chemical substances, a discussion of certain elements and their compounds, including both inorganic and organic compounds, and a qualitative survey of the most important theories used to explain this behaviour: energy relationships, electron structure and the periodic table, quantization of energy, theories of chemical bonding and of chemical reaction.

The laboratory will involve qualitative and elementary quantitative analysis elementary physical chemistry, and the preparation of certain organic and inorganic compounds.

TEXTS: (a) Sienko and Plane, *Chemistry*; (McGraw-Hill, 1961).

(Saunders, 1959).

(b) Sorum, *Introduction to Semimicro Qualitative Analysis* (Prentice Hall, 3rd edition, 1960).

PREREQUISITES: Chemistry 110 and Mathematics 110 and 112, or equivalents.

Day and Evening Divisions: 1961-62 (lectures three hours a week, laboratory three hours a week).

Professor Wiles

CHEMISTRY 310. [8]. *Physical Chemistry*

Structure of atoms and molecules, kinetic theory of gases, properties of liquids and solids, thermodynamics and thermochemistry, free energy and homogeneous and heterogeneous chemical equilibria, properties of solutions of electrolytes and non-electrolytes, phase equilibria, electrolytic conduction, electrochemical cells, colloids, types of chemical reaction, laws of chemical kinetics.

TEXTS: Daniels and Alberty, *Outline of Physical Chemistry* (J. Wiley, 2nd edition, 1961).

Daniels, Matthews and Williams, *Experimental Physical Chemistry* (McGraw-Hill, 5th edition, 1956).

PREREQUISITES: Chemistry 210 and Mathematics 211.

Day Division: Annually (lectures three hours a week, problems one hour a week, laboratory three hours a week).

Evening Division: Not offered 1961-62.

Professor Holmes

CHEMISTRY 315. *Applied Physical Chemistry*

Atomic and molecular structure, kinetic theory of gases and liquids, structure and properties of ionic and molecular crystals, glasses, polymers, dielectrics and semiconductors, thermodynamics, chemical and phase equilibria, chemical kinetics, properties of electrolytes, electrochemical and fuel cells, corrosion, protective coatings, plastics, nuclear processes, chemical effects of ionizing radiation.

TEXT: Moore, *Physical Chemistry* (Prentice-Hall, Second edition, 1959).

PREREQUISITES: Chemistry 210 and Mathematics 211.

Day Division: Lectures two hours a week.

Professor Cherniak

CHEMISTRY 320. [2] *Organic Chemistry*

An introductory course in organic chemistry, consisting of a survey of the chemistry of aliphatic and simple aromatic compounds. Emphasis is placed on the more general theoretical principles concerning structure and reactivity. The laboratory work provides practice in preparations, reactions, and detection of the more common functional groups.

TEXTS: Noller, *Chemistry of Organic Compounds* (W. B. Saunders Co. 1957).
Fieser and Fieser, *Organic Chemistry* (D. C. Heath, 1956).

Coleman, Wauzonek and Buckles, *Laboratory Manual of Organic Chemistry* (Prentice Hall, 1949).

PREREQUISITE: Chemistry 210.

Day Division: 1961-62. (lectures three hours a week, laboratory four hours a week).

Evening Division: Not offered, 1961-62.

Professor Laughton

CHEMISTRY 330. *Quantitative Analysis*

A course in quantitative analysis, covering the fundamental methods of volumetric and gravimetric analysis and selected instrumental methods.

TEXTS: Hamilton and Simpson, *Talbot's Quantitative Analysis* (Macmillan, 11th Edition, 1958).

PREREQUISITE: Chemistry 210.

Day Division: 1961-62 (lectures two hours a week, laboratory six hours a week).

Evening Division: Not offered, 1961-62.

Professor Morton

CHEMISTRY 340. *Organic Chemistry*

The lecture work consists of a survey of alicyclic, polynuclear aromatic and heterocyclic chemistry, with emphasis on methods of structure proof and synthesis, and the application of the electronic theory to problems of structure and reactivity. The laboratory work on preparative techniques, and qualitative identification of organic compounds singly and in mixtures, is accompanied by paper problems of the same kind.

TEXTS: Fieser and Fieser, *Organic Chemistry* (D. C. Heath, 3rd Ed. 1956).
Shriner, Fuson and Curtin, *Systematic Identification of Organic Compounds* (Wiley, 1956).

PREREQUISITE: Chemistry 320.

Day Division: Lectures three hours per week, laboratory four hours per week.

Professor Laughton

CHEMISTRY 350. *Physical Chemistry*

Chemical thermodynamics, theory of electrolytic solutions, surface phenomena, atomic and molecular energy levels, molecular spectra and structure, statistical mechanics of ideal gases, kinetics and mechanism of chemical reactions.

TEXT: Aston and Fritz, *Thermodynamics and Statistical Thermodynamics* (John Wiley, 1959).

REFERENCE TEXTS: Rutgers, *Physical Chemistry* (Interscience, 1954)
Brand and Speakman, *Molecular Structure* (Edward Arnold, 1960)

PREREQUISITE: Chemistry 310.

Day Division: Annually (lectures three hours a week, problems one hour a week, laboratory three hours a week).

Professor Cherniak

CHEMISTRY 360. *Inorganic Chemistry*

The structure of the nucleus and the atom, elementary quantum mechanical theory of atomic and molecular structure; co-ordination chemistry, solid state chemistry, and other topics in the light of atomic structure. The laboratory work involves preparative inorganic chemistry, reaction studies and radioactive tracer studies.

TEXT: Gilreath, *Fundamental Concepts of Inorganic Chemistry*, (McGraw-Hill, 1958).

PREREQUISITE: Chemistry 310 and 330 (Chemistry 330 may be taken concurrently).

Day Division: 1961-62 (lectures three hours a week, laboratory three hours a week).

Professor Wiles

CHEMISTRY 410. *Physical Chemistry*

Surface chemistry, chemical kinetics.

REFERENCE TEXTS: To be announced.

PREREQUISITE: Chemistry 350.

Day Division: Lectures and seminars three hours a week, laboratory three hours a week.

Professors Holmes and Cherniak

CHEMISTRY 420.[370]. *Organic Chemistry*

Selected topics such as electronic theories of structure, the mechanisms of organic reactions, stereochemistry, and the chemistry of more complex naturally occurring substances. Students will be required to demonstrate a capacity for interpreting and criticizing the original literature.

TEXT: To be announced.

PREREQUISITE: Chemistry 340, and permission of the instructor.

Day Division: 1961-62 (lectures three hours a week, laboratory three hours a week).

Professor Laughton

CHEMISTRY 440 [9]. *Biochemistry*

A survey course in plant and animal biological chemistry arranged in conjunction with the Biology Department and available only to advanced students.

PREREQUISITE: Permission of the Department.

Day Division: Not offered 1961-62.

CHEMISTRY 460. *Radiochemistry*

The structure of nuclei, radioactive, disintegration, detection and measurement of radiation; chemical studies of nuclear reactions; radioactive tracer studies of chemical phenomena.

TEXTS: Friedlander and Kennedy, *Nuclear and Radiochemistry* (Wiley, 1955)
Haissinsky, *La chimie nucléaire et ses applications* (Masson, 1957)

PREREQUISITE: Chemistry 360 and permission of the instructor.

Day Division: 1961-62 (lectures and seminars three hours per week, laboratory three hours per week).

Professor Wiles

CHEMISTRY 490 [390, 13]. *Research Project and Seminar*

Senior students in honours chemistry will do a research project under the direction of one of the members of the Department.

A seminar will be conducted at which advanced students will present reports on recent progress in selected fields of chemistry, and from time to time experts in certain fields from outside the University will be invited to speak. The attendance at such a seminar or similar meetings at other research institutions in Ottawa is intended to bring the student into close contact with specific problems in current research.

Day Division: Annually (laboratory hours arranged, seminar periods usually two hours a fortnight).

Members of the Department

CHEMISTRY 510. *Contemporary topics in Physical Chemistry*

Professors Holmes and Cherniak

CHEMISTRY 520. *Contemporary topics in Organic Chemistry*

Professor Laughton

CHEMISTRY 560. *Contemporary topics in Inorganic and Radiochemistry*

Professor Wiles

CHEMISTRY 590. *Graduate research*

Members of the Department

CLASSICS

Associate Professor F. Ellenor M. Swallow, M.A., Ph.D.
(on leave of absence, 1961-62)

Assistant Professor;

Chairman of the Department, 1961-62 A. Trevor Hodge, M.A., Ph.D.

Lecturer J. Norman Austin, M.A.

Sessional Lecturers N. M. Goble, M.A.
W. H. Showman, M.A.

Qualified students may read for Honours in Classics, or students may elect Latin, or Greek, or a combination of the two as their major field of study in a Pass course; or students who are reading for honours in another discipline may elect either Latin or Greek as a minor.

Combined Major work or Honours work in either Greek or Latin and another discipline may be arranged upon consultation with the departmental chairmen concerned.

PASS COURSE

Major in Latin: 5 Latin courses to be chosen in consultation with the department; Classics 395; recommended also is Classical Civilization 301.

Major in Greek: 5 Greek courses to be chosen in consultation with the department; Classics 395; recommended also is Classical Civilization 300.

Major in Classics:

Emphasis on Latin: 4 Latin and 3 Greek courses to be chosen in consultation with the Department; Classics 395.

Emphasis on Greek: 4 Greek and 3 Latin courses to be chosen in consultation with the department; Classics 395.

HONOURS COURSE

First year Arts

The general requirements for First year Arts will be followed, with the following possibilities:

- 1) A student may be recommended to postpone one requirements until Second year in order to take both Greek and Latin from the beginning of his university course.
- 2) If his past record so warrants he may be recommended to take a sixth course, thus accomplishing the balance of languages from the start and the reduction of course load in the final year when he is preparing for a general examination.

Second, Third and Fourth years*:

Emphasis on LATIN:

5 further courses in Latin (of which 4 must be in the 300s)

Classical Civilization 301 (Roman history).

Classics 395 (Seminar).

3 further courses in Greek (of which 2 must be in the 300s).

4 options in other fields of study.

Emphasis on GREEK:

5 further courses in Greek (of which 3, if 115 was the first taken; or 4, if 210 was the first taken, must be in the 300s).

Classical Civilization 300 (Greek history).

Classics 395 (Seminar).

3 further courses in Latin (in the 300s).

4 options in other fields of study.

(In either case, a fifteenth course, in the appropriate grouping for the student's own course pattern, will be necessary, if five courses and not six were taken in First year Arts).

Total: 20 courses in 4 years; of these 4 First year Arts subjects and 4 courses in other Arts years will be non-classical.

Note: At the end of an honours course, students will be required to take a comprehensive examination, either written or oral, to test their general knowledge in the field of Classics.

Offerings for 1961-62 are as follows:

GREEK

GREEK 115. *Introduction to Language and Reading*

A beginning course to introduce students not only to grammar and syntax, but also to the reading of continuous prose. (Equivalent of former Greek 51 and Greek 110; one full credit).

Day Division: 1961-62 (lectures and practice periods four hours a week).

Professor Hodge

*Students may enter an honours course later than Second year, but it is likely to involve considerable re-adjustment of the program of Classics and options in the last two years.

GREEK 210. [2]. *Literature and Reading*

Study of the forms and development of Greek literature. *Reading:* Euripides, one play; Lysias, select orations. Some time will also be devoted to prose composition.

PREREQUISITE: Greek 115 or the equivalent

Day Division: 1961-62 (lectures three hours a week).

Mr. Austin

GREEK 310. *Homer and Herodotus*

Epic and the epic idea in history.

PREREQUISITE: A 200 course, or permission of the department.

Day Division: 1961-62 (two tutorial hours a week).

Mr. Goble

GREEK 370. *The Attic Orators*

The Greek art of rhetoric in practice.

PREREQUISITE: A 200 course, or permission of the department.

Day Division: 1961-62 (two tutorial hours a week).

Professor Hodge

LATIN**LATIN 110. [1]. *Language and Reading***

Review of grammar and syntax; composition. *Reading:* selections from various authors in prose and verse.

PREREQUISITE: Junior Matriculation Latin or the equivalent. Students without preparation in Latin will *not* be admitted to this class.

Day Division: 1961-62 (lectures three hours a week).

Mr. Austin

LATIN 210. [2] *Literature and Reading*

Study of the history of Latin literature. *Reading:* Selections from various authors throughout the classical period.

PREREQUISITE: Latin 110 or the equivalent.

Day Division: 1961-62 (lectures three hours a week).

Mr. Austin

LATIN 250. *Composition and Sight Translation*

The two aspects of the course will be combined for a study of vocabulary, idiom, and style, with regular practice throughout the year in both writing and reading of the language.

PREREQUISITE: Latin 110 or the equivalent.

Day Division: 1961-62 (lectures three hours a week).

Professor Hodge

LATIN 350. *The Latin Historians*

Caesar, Livy, Tacitus. The conception of history as a branch of rhetoric; historical form and method among the ancients.

PREREQUISITE: A 200 course, or permission of the department.

Day Division: 1961-62 (two tutorial hours a week).

Mr. Showman

SEMINAR**CLASSICS 395. *Special Problems***

Required of students taking their major work, or reading for Honours, in Classics.

Day Division: 1961-62 (seminar two hours a week).

Mr. Austin

CLASSICAL CIVILIZATION

CLASSICAL CIVILIZATION 300 (Formerly Classical Civilization 270). *Greece in the Ancient World.*

The history and civilization of classical Greece with special attention to the development of her characteristic institutions. Extensive reading from Greek literature, in English translation, will illustrate the patterns and growth of Greek thought. (This course is also listed as History 300).

Evening Division: 1961-62 (lectures two hours a week). This course will be alternated with Classical Civilization 301.

Professor Hodge

CLASSICAL CIVILIZATION 301 (Formerly Classical Civilization 280). *Rome in the Ancient World*

The history of ancient Rome, her growth and expansion, and her organization during the Republic and the early Empire. Selections from Latin literature will be read in English translation, to show her characteristic ways of thought. (This course is also listed as History 301).

Not offered, 1961-62. This course will be alternated with Classical Civilization 300.

Other offerings, given in rotation with the Greek and Latin "300" courses listed above, are: Greek—250: Prose composition; 320: Thucydides and historiography; 330: The Tragedians; 340: Philosophy; 350: Lyric and reflective poetry; 360: Comedy.

Latin—315: Letters; 325: Lyric and Elegy; 330: Comedy and Satire; 340: Oratory in theory and practice; 360: The writers of philosophy; 370: Virgil and the epic tradition.

COMMERCIAL LAW

Sessional Lecturer M. E. Corlett, B.A.

COMMERCIAL LAW 210. [COMMERCE 1]. *Commercial Law*

The law of contract and agency, sale of goods, negotiable instruments, partnerships and companies, bankruptcy and insolvency, bills of sale and chattel mortgages.

Evening Division: Annually (lectures three hours a week). Mr. Corlett

NOTE: Enquiries concerning the course in Commercial Law should be directed to the Chairman of the Department of Economics.

ECONOMICS

Professor H. S. Gordon, B.A., A.M.

Associate Professor; Chairman of the Department, 1961-62 . H. E. English, Ph.D.

Associate Professor T. N. Brewis, M.Com., Ph.D.

Assistant Professor S. F. Kaliski, M.A., Ph.D.

Sessional Lecturers John Knapp, M.A., L. M. Read, M.A.
J. S. Wells, B.Sc., T. Gigantis, M.A.

The Economics courses are divided into six categories:

1. Economics 210 — to be taken in First year.
2. Basic courses in theory, economic history and statistics. Economics 300, 310, 315 (or 360), and 320 — appropriately taken in Second year.
3. Second or Third year options — courses numbered 325-399.
4. Senior options — courses numbered 400-479 — normally taken in Third or Fourth year (also see Graduate Studies).
5. Special honours courses — courses numbered 480-499 — for honours students only.
6. Graduate seminars and thesis — Economics 500, 510 and 580.

Students who wish to major or take honours in Economics will be expected to fulfill summer reading requirements.

MAJOR COURSE

Students who intend to major in Economics will normally take at least six Economics courses — categories 1 and 2 and at least one course from category 4. One of the category 2 courses may be postponed to Third year. The student's program for the Second and Third years must be approved by the Chairman of the Department of Economics.

HONOURS COURSES

Economics. Honours programs may be entered from the Honours First year in the Social Sciences (see pp. 67-69), or by transfer from the major course if second class standing has been obtained.

The honours requirement includes courses in categories 1 and 2, at least two from category 4, and the modern classics tutorial and honours essay (category 5). Each student will be assigned a tutor in his Third and Fourth years. There will be a comprehensive examination (written and oral) at the end of the final year. Honours students will not be required to write final examinations in their Economics courses in their Third and Fourth years.

The student's program for the Second and subsequent years will be planned in consultation with the Chairman of the Department of Economics.

Combined Honours in Economics and Political Science: Students intending to take this course should take Economics 210 or Political Science 210 (or preferably both) in the First year. The choice of courses in subsequent years will be subject to the approval of the chairmen of the two departments. The honours requirements include at least six courses in Economics and six courses in Political Science, one of which must be Political Science 390 or Economics 495, to be taken in the student's final year. These will be arranged so that the student may transfer either to full honours in Economics or to full honours in Political Science at the end of the Third year, if he then wishes to specialize more intensively.

Consideration will also be given to applications for Combined Honours in Economics and History, and Economics and Sociology.

GRADUATE STUDIES

The Department of Economics offers studies leading to the degree of Master of Arts with specialization in any of the following fields:

Money and Banking, Public Finance, International Trade, Natural Resources, Industrial Organization and Public Policy, Comparative Political Economy, History of Economic Thought.

A student wishing to enter the M.A. program must have an honours degree in Economics or its equivalent in both content and standing. A candidate may be required to supplement his basic undergraduate work by taking appropriate undergraduate courses at Carleton in addition to his work for the M.A. A student holding a pass degree and no further training will ordinarily be required to take a qualifying year (5 courses) before being admitted to M.A. candidacy.

A candidate for the M.A. in economics will (1) take the two graduate seminars and an approved course from category 4 (in which additional work may be assigned), (2) present a thesis and (3) pass comprehensive examinations. Grades of B or better must be obtained throughout in courses, comprehensives, and thesis. At present the graduate program is offered in the evening division only, and a student entering the M.A. program without conditions will normally take three years to complete his requirements for the degree.

ECONOMICS 210. [2]. *Principles of Economics*

An introduction to the concept of economic welfare and its relation to society's other economic goals, e.g. the efficient use and allocation of resources, an appropriate rate of growth of production, and stability in output, employment, and prices. The basic principles and statistical measures used in explaining these goals and the means of achieving them are discussed. Public policies affecting the distribution of income, the control of monopoly, and the maintenance of stability in employment and prices are also discussed.

Day Division: Annually (lectures and discussion, three hours a week).

Evening Division: Annually (lectures and discussion, three hours a week).

Summer Session, 1961 (lectures five hours a week).

Professors Gordon and Kaliski, Mr. Wells, and others

ECONOMICS 300. [9, 365]. *Price Theory*

The modern analysis of production and distribution with special reference to the determination of the conditions which maximize social welfare. The major causes of departure from the social welfare optimum in a full employment economy, with particular attention to imperfections in competition.

PREREQUISITE: Economics 210.

Day Division: Annually (lectures two hours a week).

Summer Session, 1961 (lectures five hours a week).

Professor English and Mr. Knapp

ECONOMICS 310. [8, 103]. *Monetary Theory and Institutions*

The theory and practice of banking and finance, with special reference to the economic functions of financial institutions. The theory of monetary policy and central banking and its Canadian applications. The analysis of major problems of an organizational nature: inflation and unemployment. The theory and practice of international finance.

PREREQUISITE: Economics 210.

Day Division: Annually (lectures three hours a week).

Evening Division: 1962-63 and alternate years (lectures two hours a week).

Professor Gordon

ECONOMICS 315. [10, 105]. *Economic History*

(offered in the Department of History as History 315). See notation as History 315.

An examination of the development of economic institutions since the Middle Ages, especially those aspects of history which may be used to explain the character of the principal economic institutions and practices of the present day.

PREREQUISITE: Economics 210, or the permission of the instructor.

1962-63 and alternate years.

ECONOMICS 320. [16]. *Statistical Methods in the Social Sciences*

An introduction to the principal statistical measurements. The use of statistical analysis as a method for the precise and reliable acquisition of knowledge in the social sciences will be stressed. The misuse of statistical information will be examined. (This course is listed also as Sociology 355. Economics 320 will yield a half credit only, if Mathematics 230 has been taken for credit).

PREREQUISITE: Mathematics 115, and one of Economics 210, Political Science 210, Psychology 210 or Sociology 210; or the permission of the instructor.

Day Division: Annually (lectures two hours a week, laboratory two hours a week).

Evening Division: 1961-62 and alternate years (lectures two hours a week, laboratory two hours a week).

Professor Kaliski and Mr. Gigantis

ECONOMICS 331. *Theory of Economic Growth*

An introduction to contemporary developments in the theory of economic growth. Several recent growth models and their antecedents are examined, compared, and criticized. (Half course.)

PREREQUISITE: Economics 210, and preferably Economics 310.

Not offered, 1961-62.

ECONOMICS 341. *National Accounting*

An introduction to the principles of national accounting, including a study of national income and expenditure accounts, input-output accounts, and national transactions (money flows) accounts, with emphasis on Canadian practice. (Half course).

PREREQUISITE: Economics 210.

Evening Division: 1961-62 (lectures two hours a week, *second* term).

Professor Read

ECONOMICS 360. [3]. *The Economic Development of Canada*

(Offered in the Department of History as History 360).

ECONOMICS 366. *Business Finance*

The financing of business enterprise, the capital and stock markets and other financial institutions. The influence of government on the direction and financing of investment (Half course.)

PREREQUISITE: Economics 210.

Day Division: 1961-62 (lectures two hours a week, *first* term).

Professor Brewis

ECONOMICS 380. [Commerce 4, 335]. *Labour Economics and Industrial Relations*

An examination of the position of the labourer in the Canadian economy and of the economic and sociological theory related to this study. The place and function of the government in the relationship between management and labour, trade unions — their aims and history. Collective bargaining — its purpose and meaning to industry and to labour.

PREREQUISITE: Economics 210.

Not offered, 1961-62.

ECONOMICS 386. *Problems of Development*

An examination of the conditions of growth in production and economic welfare. Special attention is devoted to the difficulties of underdeveloped areas and to attempts to overcome these difficulties. (This course is appropriately taken following Economics 331). (Half course.)

PREREQUISITE: Economics 210, and the permission of the instructor.

Not offered, 1961-62.

ECONOMICS 400. *Mathematical Economics and Econometrics*

An introduction to some of the simpler mathematical models of economic theory and to estimates based upon them. Both aggregative and micro-economic models will be considered. Attention will be divided between formal aspects of the models and estimating procedure. Students will be assumed to have an adequate knowledge of elementary calculus and simpler algebra, but other mathematical tools will be developed as they are needed.

PREREQUISITE: Economics 300 and 320; Mathematics 200 or 211; and the permission of the instructor.

1962-63 and alternate years.

ECONOMICS 420. [15, 370]. *History of Economic Thought*

The principal developments in economic theory and doctrine especially during the nineteenth century. The principal theorists and the influential popular writers of the period. The relation of economic theory and doctrine to contemporaneous social, political, and philosophical ideas and to economic and political events.

PREREQUISITE: Economics 300 and the permission of the instructor.

Evening Division: 1961-62 and alternate years (lectures and seminars, two hours a week).

Professor Gordon

ECONOMICS 430. *Industrial Organization and Public Policy*

An analysis of the organization of Canadian industry, with reference to associated U.S. industry where necessary. A few representative industries are examined in some detail. Price theory is used to distinguish economic from institutional factors affecting the structure of the economy. Emphasis is laid upon public policies which affect, intentionally or otherwise, the organization and behaviour of industry, e.g., public utility regulation, control of restrictive practices, commercial policy, and price supports.

PREREQUISITE: Economics 300.

Not offered, 1961-62.

ECONOMICS 440. [11, 106, 345]. *Public Finance*

The place of public expenditures and revenue in the national economy, taxation, debt management, and the role of fiscal policy in economic stabilisation.

PREREQUISITE: Economics 300 or 310.

1962-63 and alternate years.

ECONOMICS 450. *Economic Fluctuations and Stabilization Policy*

An analysis of the nature and causes of fluctuations in income, employment and prices, and related government policy. Some consideration of the problems and techniques involved in economic forecasting.

PREREQUISITE: Economics 310.

Evening Division: 1961-62 and alternate years (lectures two hours a week).

Professor Brewis

ECONOMICS 460. [7, 102, 340]. *International Trade*

An examination of the theory of international trade and payments and its applications. The current body of theory and its historical development are discussed, as are a number of attempts to verify and quantify the theory. A number of present day problems, policies, and institutions are examined in the light of the theory and empirical findings.

PREREQUISITE: Economics 300.

Evening Division: 1961-62 (lectures two hours a week).

Professor Kaliski

ECONOMICS 470. [14, 375]. *Comparative Political Economy*

A discussion of the relationship between ideology, economic theory, and actual organization in the principal contemporary economies. The course includes a comparative study of the origin, structure and operation of the economic institutions of the United States and Canada, the Soviet Union, the United Kingdom, and other economies.

PREREQUISITE: Economics 300.

Day Division: 1961-62 and alternate years (lectures and seminars, two hours a week).

Professor English

ECONOMICS 480. [390, 100]. *Tutorial in Modern Classics*

An honours student will be expected, usually in his final year, to read a group of original works selected in consultation with a member of the Department assigned as tutor. The student will meet regularly with his tutor to discuss his reading and to read papers based upon it.

PREREQUISITE: Permission of the Chairman of the Department.

Day Division: Annually (tutorial hours arranged).

ECONOMICS 485. [391, 101]. *Tutorial in Economics*

An additional tutorial in economics may be taken subsequent to or concurrently with Economics 390. A program of study will be designed to accord with the student's individual needs.

PREREQUISITE: Permission of the Chairman of the Department.

Day Division: Annually (tutorial hours arranged).

ECONOMICS 495. *Honours Essay*

A student taking honours in economics must write an honours essay during his final year. The essay will count for one or two course credits.

PREREQUISITE: Permission of the Chairman of the Department.

ECONOMICS 500. *Advanced Economic Theory*

1962-63 and alternate years.

ECONOMICS 510. *Applied Economics: currently, The Canadian Economy*

Evening Division: 1961-62 and alternate years (seminar, two hours a week).

Professors Brewis and English

ECONOMICS 580. *M.A. Thesis*

ENGINEERING

<i>Professor, Director of the School</i>	John Ruptash, B.Sc., M.A.Sc., Ph.D.
<i>Assistant Professor, Assistant Director</i>	S. G. Tackaberry, C.B.E., B.A.Sc.
<i>Associate Professors</i>	W. H. Bowes, B.Eng., M.Eng., M.Sc.
	E. E. Goldsmith, Dipl.Eng., D.I.C. (on leave of absence, 1961-62)
	Malcolm A. Gullen, B.Sc., M.S.
	R. Putnaerglis, Mech.Eng., M.Eng., P.Eng.
<i>Assistant Professors</i>	H. Majmudar, B.Sc., D.I.I.Sc., M.S.E.E., Ph.D.
	Whitman Wright, B.A.Sc.
<i>Lecturer</i>	K. Van Dalen, B.Sc., D.I.C., M.Sc.
<i>Sessional Lecturers</i>	M. S. Chappell, B.A.Sc.
	E. P. Cockshutt, B.A.Sc., S.M., Mech.Eng., Sc.D., C. B. Crawford, M.Sc., D.I.C.,
	G. J. Klein, B.A.Sc., R. C. McDonald, B.A.Sc., C. H. Ney, B.A.Sc., O.L.S.,
	D.L.S., D. G. Stephenson, B.A.Sc., Ph.D., Hans J. von Baeyer, Ph.D.

ENGINEERING 200. *Engineering Drawing*

Selection and use of instruments; lettering; applied geometry; orthographic projection; freehand and instrument drawing; auxiliary and oblique views; sections and conventions; pictorial sketching and drawing including isometric, oblique and perspective; dimensions and notes, including precision and limit dimensioning; screw threads; fasteners; use of piping and welding symbols; detail and assembly drawings; elements of structural drawings; descriptive geometry including point, line, plane problems, curved and warped surfaces, intersections and developments; use of reference books, handbooks and catalogues; introduction to simplified practice in engineering drawing.

Lectures 1 hour a week, *both* terms.

Laboratory 5 hours a week, *both* terms.

TEXTS: French and Vierck, *Engineering Drawing*, 9th Edition.

Wellman, *Technical Descriptive Geometry*, 2nd Edition.

Professor Tackaberry

ENGINEERING 205. *Surveying*

Principles and practices of surveying; probable and permissible errors; adjustments of surveys; computation of plane and spherical areas, volumes and curves; ratio of precision; curvature and refraction; borrow pit, building layout; convergence of meridians; contours and profiles; theory, use and adjustment of instruments; Dominion Land Survey systems; practical astronomy and sun observations.

Lectures 2 hours a week, *second* term.

TEXT: Davis and Foote, *Surveying*, 5th Edition.

ENGINEERING 206. *Surveying Field Work*

Chain and stadia traversing; direct and trigonometric levelling; mapping and contouring; obtaining areas and volumes; determining azimuth of a line by means of a sun observation; calculating and staking a circular curve; measuring and drawing structural and topographical features.

2½ weeks at the end of *second* term.

ENGINEERING 210. *Mechanics I*

Principles of statics; composition and resolution of forces and force systems; principles of equilibrium; graphical and analytical analysis of forces in simple frame structures and cables; center of gravity; location of centroids; friction; work; principle of virtual work; potential energy; conservative force systems.

Lectures 3 hours a week, *second* term.

TEXT: Langhaar and Boresi, *Engineering Mechanics*.

Professor Bowes

ENGINEERING 270. *Introduction to Machine Tools*

Hand and machine tools; capabilities of drill press; engine lathe; shaper, milling machine and grinder; drilling, counterboring, centering, parallel and taper turning, shouldering, thread cutting, shaping horizontal, vertical and angular surfaces, surface and contour milling and grinding; abrasive wheels; use of jigs and fixtures; S.A.E. steel numbering system.

Laboratory 4 hours a week, *first term*.

TEXT: None prescribed.

Professor Tackaberry

ENGINEERING 311. *Mechanics II*

Introduction to vector methods; kinematics and dynamics of particles and rigid bodies; rectilinear, curvilinear, rotational and general motion of bodies; principles of work and energy; impulse and momentum principles.

Lectures 2 hours a week, *both terms*.

Problem analysis and laboratory demonstrations 3 hours alternate weeks, *both terms*.

TEXT: Langhaar and Boresi, *Engineering Mechanics*.

REFERENCE: den Hartog, *Mechanics*.

Professor Bowes

ENGINEERING 320. *Mechanics of Materials I*

Stress; strain; factor of safety; Hooke's Law for normal and shearing stresses; Poisson's ratio; axial load; torsion of circular, rectangular and thin-walled members; stress concentrations; beams in bending and shear; shear in beam webs; curved beams; deflection of beams; the moment area method; combined axial and bending stresses; combined flexure and torsion; simple columns; the Euler formulae; design formulae for axially loaded columns; plane stress and strain; Mohr's circle; principal stresses; introduction to failure theories; energy methods; strain energy; Castigliano's theorem; impact loads; introduction to plastic behavior and fatigue.

Lectures 2 hours a week, *both terms*.

Problem analysis and laboratory demonstrations 3 hours alternate weeks, *both terms*.

TEXT: Popov, *Mechanics of Materials*.

REFERENCE BOOK: Timoshenko and MacCullough, *Elements of Strength of Materials*.

Mr. Van Dalen

ENGINEERING 340. *Engineering Thermodynamics*

Definition of basic concepts including heat, work, temperature; Statements of the First Law, and its application to systems and control volumes; Statements of the Second Law, and its corollaries with respect to temperature, entropy, and availability; Thermodynamic properties of pure substances including perfect gases, vapours, and liquids; Thermodynamic properties of gaseous mixtures including psychrometry; Heat engine cycles, including Otto, Diesel, Brayton, and Rankine cycles; Application of the First Law to combustion processes.

Lectures 2 hours a week, *both terms*.

Problem analysis 3 hours alternate weeks, *both terms*.

TEXT: Mooney, *Introduction to Thermodynamics and Heat Transfer*.

REFERENCES: Doolittle, *Thermodynamics for Engineers*.

Van Wylen, *Thermodynamics*.

Dr. Cockshutt

ENGINEERING 401. *Mechanical Analysis and Design*

Stress analysis; design factors; properties of materials; stress concentration, notch sensitivity and fatigue; curved beams; columns with axial and transverse loading; power screws; screw fastenings and connections subject to variable loads; shafts; funicular polygon method of determining the elastic curve and critical speed of shafts — general case; springs; journal and plane bearings; rolling bearings; belt and chain drives; spur, helical, bevel, hypoid and worm gearing; couplings, brakes and clutches.

Lectures 2 hours a week, *both terms*.

Problem analysis 3 hours a week, *both terms*.

TEXT: Faies, *Design of Machine Elements*.

REFERENCES: Merritt, *Gears*.

Shigley, *Machine Design*.

Mr. Klein and Professor Bowes

ENGINEERING 411. *Mechanics of Machines and Mechanical Vibrations*

Principles of mechanics applied to analysis of motions in linkages, cams, gears; simple, compound and epicyclic gear trains; determination of forces in machine elements due to external loads and internal inertia; static and dynamic balancing; mechanical vibrations — free and forced vibrations with and without damping in systems having one or two degrees of freedom.

Lectures 2 hours a week, *both* terms.

Problem analysis and laboratory demonstrations 3 hours alternate weeks, *both* terms.

TEXT: Mabie and Ocvirk, *Dynamics of Machinery*.

REFERENCE BOOK: den Hartog, *Mechanical Vibrations*.

Professor Bowes

ENGINEERING 421. *Mechanics of Materials II*

Statically indeterminate problems in tension and compression; thermal stresses; concentrically and eccentrically loaded connections with rivets, bolts or welds in shear or tension; moving loads; lateral buckling of beams, bending that does not follow Hooke's Law, beams of two materials, shear center, unsymmetrical bending; deflection due to unsymmetrical bending, deflection due to shear; statically indeterminate problems in bending by the method of superposition, by the double integration method; continuous beams with elastic supports, with settlement of supports; the tangent modulus formula for columns, columns with initial eccentricity, the secant formula, design formulas for columns subject to combined axial load and bending; triaxial stresses, failure theories; the effects of high and low temperatures upon metals; fatigue; introduction to the bending of flat plates; introduction to photo-elasticity and the use of electric resistance strain gauges.

Lectures 2 hours a week, *first* term.

Laboratory 3 hours a week, *first* term.

TEXT: Timoshenko and MacCullough, *Elements of Strength of Materials*.

REFERENCE: Popov, *Mechanics of Materials*.

Professor Wright

ENGINEERING 422. *Structural Analysis and Design*

Structural Analysis: Review of plane statics; advanced analysis of statically determinate plane trusses; moving loads and influence lines; statically determinate space structures; analysis of elastic systems by energy methods; deflection of trusses by graphical and analytical methods; statically indeterminate pin-jointed trusses; analysis of rigid frames with prismatic or haunched members by slope deflection and moment distribution; arches; analysis of rigid frames for plastic design; the column analogy; guyed towers.

Structural Design: Load analysis; special problems in the design of tension members, compression members and beams; design of plate girders, trusses and floor and roof systems; advanced design of riveted, bolted and welded connections; design of buildings including industrial and multistory buildings; design of girder and truss bridges; introduction to plastic design; design in timber; economic considerations and cost estimates.

Lectures 4 hours a week, *both* terms.

Problem analysis and laboratory demonstrations 3 hours a week, *both* terms.

TEXTS: Timoshenko and Young, *Theory of Structures*.

Gaylord and Gaylord, *Design of Steel Structures*.

REFERENCES: A.I.S.C. *Steel Construction Manual*.

National Building Code of Canada.

Scofield and O'Brien, *Modern Timber Engineering*.

Professor Wright

ENGINEERING 423. *Reinforced Concrete*

Basis of elastic design, moments of resistance, transformed areas, and derivation of design equations. Rectangular beams with tensile and compressive reinforcement. Diagonal tension, shear and bond, and design of web reinforcement. Design of T beams, slabs and columns. Discussion of secondary effects, shrinkage, creep and temperature stresses. Continuous beams and frames; design of floor framing system and retaining wall with emphasis on detailing and familiarization with current specifications.

Lectures 3 hours a week, *second* term.

Problem analysis and laboratory demonstrations 3 hours a week, *second* term.

REFERENCES: Urquhart, O'Rourke, and Winter, *Design of Concrete Structures*.

Ferguson, *Reinforced Concrete Fundamentals*.

Mr. Van Dalen

ENGINEERING 424. *Soil Mechanics*

Theoretical development of the science of soil mechanics. Course includes historical development, soil classification, compaction and stabilization, permeability and seepage, stresses in soil, bearing capacity and earth pressures, ground temperatures, frost action and pavement design. Theory and application of consolidation. Emphasis is given to the strength of soils in terms of effective stresses. Methods of measurement are outlined. The effect of time on test results and stability analyses is discussed. The lectures are supplemented by assigned problems and laboratory experiments.

Lectures 3 hours a week, *first term*.

Laboratory 3 hours alternate weeks, *first term*.

TEXT: Taylor, *Fundamentals of Soil Mechanics*.

REFERENCES: Terzaghi, *Theoretical Soil Mechanics*.

Bishop and Henkel, *Measurement of Soil Properties in Triaxial Test*.

Mr. Crawford and Mr. Van Dalen

ENGINEERING 427. *Metallurgy*

Problems in the choice and use of metals; atomic and crystalline structure of metals; movements of atoms; relationships between like and unlike atoms; phases; phase diagrams; typical metallurgical reactions; grains; growth, size, deformation, recrystallization; micro-aspects of strength and ductility of metals and alloys; methods and apparatus for research and non-destructive testing; unit operations in extractive metallurgy; corrosion, oxidation and scaling of metals; ferrous metals; non-ferrous metals; heat treatment of metals and alloys; bonding of metals.

Lectures 2 hours a week, *both terms*.

Laboratory 3 hours alternate weeks, *both terms*.

TEXT: Guy, *Elements of Physical Metallurgy*.

REFERENCE BOOKS: Cottrell, *Theoretical Structural Metallurgy*.

Wulff, Taylor and Shaler, *Metallurgy for Engineers*.

Professor Putnaerglis

ENGINEERING 430. *Fluid Mechanics*

Fundamental concepts; properties of fluids; fluid statics; fluids in relative equilibrium; fundamental equations for steady one-dimensional nonviscous incompressible flow; selected applications; dimensional analysis, dynamic similarity; laminar flow, turbulent flow, boundary layer, skin friction and drag estimation; pipe line problems; open channel flow; one-dimensional steady isentropic flow, shock waves; elements of two-dimensional steady nonviscous incompressible flow. The lectures are supplemented by assigned problems and laboratory experiments.

Lectures 2 hours a week, *both terms*.

Laboratory 3 hours alternate weeks, *both terms*.

REFERENCES: Binder, *Fluid Mechanics*.

Streeter, *Fluid Mechanics*.

Vennard, *Elementary Fluid Mechanics*.

Professor Ruptash

ENGINEERING 431. *Hydraulics*

Hydrologic cycle, precipitation, streamflow, evaporation, hydrograph analysis, volume of runoff. Groundwater, aquifers, springs, artificial recharge and storage. Frequency analysis of floods, rainfall and droughts. Determination of reservoir storage capacity, mass curves. Description and selection of turbines and pumps. Water supply and purification, demand, distribution reservoirs, filtration, disinfection and softening. Sewerage and sewage treatment, sewage flow, appurtenances, design of sanitary and combined sewers, cycle of decay, self purification, primary and secondary treatment.

Lectures 3 hours a week, *first term*.

Laboratory 3 hours alternate weeks, *first term*.

TEXT: Linsley and Franzini, *Elements of Hydraulic Engineering*.

Mr. Van Dalen

ENGINEERING 432. *Fluid Dynamics*

Foundations of fluid dynamics, two-dimensional steady nonviscous incompressible flow, one-dimensional steady isentropic flow, normal and oblique shock waves, adiabatic flow in nozzles and diffusers, methods of measurement in high speed flow, viscous flows and boundary layer theory, diabatic flow. The lectures are supplemented by assigned problems.

Lectures 3 hours a week, *first term*.

REFERENCES: Dommasch, *Principles of Aerodynamics*.

Liepmann and Roshko, *Elements of Gasdynamics*.

Kuethe and Schetzler, *Foundations of Aerodynamics*.

Shapiro, *Dynamics and Thermodynamics of Compressible Fluid Flow*, Vol. I.

Professor Ruptash

ENGINEERING 441. *Thermodynamics and Heat Transfer I*

Introduction to heat transfer including steady state heat conduction, empirical relationships between dimensionless parameters for convection and fundamentals of energy exchange by radiation. Heat engines with equal emphasis on internal combustion gas turbine and steam turbine power plants. Theoretical thermodynamic cycles are reviewed and the practical considerations which limit the performance of each heat engine system are considered. Performance parameters of contemporary systems of each type are compared. Reversal of gas and vapour power cycles for refrigeration purposes. The laboratory experiments are designed to complement the lectures through a comparison of experimental results with theoretical analyses.

Lectures 1 hour a week, *both terms*.

Laboratory 3 hours alternate weeks, *both terms*.

TEXTS: Doolittle, *Thermodynamics for Engineers*.

Messersmith, Warner and Olsen, *Mechanical Engineering Laboratory*.

ENGINEERING 442. *Thermodynamics and Heat Transfer II*

Heat transfer: non-steady state conduction in one dimension, interrelationship of heat exchanger effectiveness with pressure drop, heat exchange to boiling liquids and condensing vapours, soil-air temperature concept and radiant energy exchange between plane surfaces of finite size. Internal combustion engine: cooling system design, supercharging, turbo compound engine system and free piston gas generator. Analysis of gas turbine cycles: variable specific heats, pressure losses, compressor performance maps. Simple jet engine performance under static and flight conditions. Steam turbines: cycles for atomic power plants, design of turbine blade profiles, steam generators, condensers and cooling towers. Refrigeration and air conditioning.

Lectures 2 hours a week, *both terms*.

Laboratory 3 hours alternate weeks, *both terms*.

REFERENCE BOOKS: Jacob and Hawkins, *Elements of Heat Transfer*.

Adams, *Internal Combustion Turbine Theory*.

Potter, *Steam Power Plants*.

Stoecker, *Refrigeration and Air Conditioning*.

ENGINEERING 443. *Energy Conversion*

Conversion of matter into energy. Energy from nuclear fission reactors. Development of nuclear fusion (thermo-nuclear) reactors. Natural and artificial collectors of solar energy. Hydro, tidal and wave power stations. Wind power plants. Photoelectric batteries. Geothermal and low thermal head stations. Thermoelectric, thermionic and magneto-hydrodynamic energy conversion. Fuel cells. Other unconventional power sources. Storage of surplus heat energy. Electrical and electromagnetic energy conversion. Selected topics from steam power, heat transfer, and economics of energy conversion.

Lectures 3 hours a week, *second term*.

Laboratory 3 hours alternate weeks, *second term*.

TEXT: None prescribed.

REFERENCE BOOKS: Kaye and Welsh, *Direct Conversion of Heat to Electricity*.

Skrotzki and Vopat, *Applied Energy Conversion* (2nd Ed.).

Solberg, Cromer and Spalding, *Thermal Engineering*.

Ku, *Electric Energy Conversion*.

White and Woodson, *Electromechanical Energy Conversion*.

Schenck, *Heat Transfer Engineering*.

Lapp and Andrews, *Nuclear Radiation Physics* (2nd Ed.).

Professor Putnaerglis

ENGINEERING 450. *Fundamentals of Electric Circuits and Machines*

D.C. and A.C. circuits; complex algebra; harmonics; Fourier series; Thevenin's theorem; applications of complex notation; power in A.C. circuits; frequency response and resonance; maximum power conditions; polyphase circuits star-delta relationships; transients in D.C. and A.C. circuits; series and parallel magnetic circuits; D.C. and A.C. excitation; hysteresis and eddy currents; saturable core reactors; transformers; equivalent circuits; D.C. machines; induction motors; synchronous machines; instrumentation; transmission; control systems; mercury arc rectifiers.

Lectures 3 hours a week, *both terms*.

Laboratory 3 hours a week, *both terms*.

TEXT: Fitzgerald and Higginbotham, *Basic Electrical Engineering*.

Professor Majmudar

ENGINEERING 451. *Circuit Analysis and Transients*

Analysis of simple circuits, superposition, node, mesh, substitution method of analysis, resonance, graphical methods, network equations, coupled circuits and transformers, non-linear elements, Fourier Series, Exponential Fourier Series and Fourier Integral, transient response and the complex frequency plane, Heaviside expansion, Laplace Transformation, two-terminal pair networks, filters, balanced and unbalanced three-phase circuits, symmetrical components, short-circuits.

Lectures 2 hours a week, *both terms*.

Laboratory 3 hours alternate weeks, *both terms*.

TEXTS: Skilling, *Electrical Engineering Circuits*.

Skilling, *Transient Electric Currents*.

Professor Majmudar

ENGINEERING 452. *Electrical and Electronic Measurements*

Problems in measuring mechanical quantities; the use of transducers; telemetering. Functional Analysis of measurements. A survey of primary detectors, intermediate means and of end devices. Accuracy, precision and sensitivity of measuring systems. Analysis of primary detectors (transducers) for: temperature, sound, force, displacement, thickness, pressure, vacuum, leak detection, rate of flow, gas density, liquid turbidity, viscosity, time, etc. A survey of applications.

Lectures 2 hours a week, *first term*.

Laboratory 3 hours alternate weeks, *first term*.

TEXT: Kinnard, *Applied Electrical Measurements*.

REFERENCES: Michels, *Electrical Measurements and Their Applications*.

Holzbock, *Instruments for Measurement and Control*.

Schulz, Anderson and Leger, *Experiments in Electronics and Communication Engineering*, 2nd Ed.

Professor Putnaerglis

ENGINEERING 453. *Electric Transmission*

Theory of transmission of Electromagnetic waves along linear conductors: basic differential equations and their solution, line constants and transmission parameters, elements of matching under steady state and transient conditions. Application of transmission lines; power lines, telephone and telegraph lines, radio frequency lines, wave guides. Transition from guided to radiated wave propagation. General theory of antennas, near and far fields, reciprocity, characteristics of linear antennas and horn radiators, arrays, apertures and reflectors. Transmission formulae for free space propagation. Reflection, refraction, diffraction and scattering of radio waves. Analysis of composite transmission systems.

Lectures 2 hours a week, *both terms*.

TEXTS: Skilling, *Electric Transmission Lines*.

Kraus, *Antennas*.

REFERENCE BOOKS: Kimbark, *Electrical Transmission of Power and Signals*.

Jordan, *Electromagnetic Waves and Radiating Systems*.

Reference Data for Radio Engineers, 4th Ed. Federal Telephone and Radio Corp.

Principles of Electricity, American Telephone & Telegraph Co., Northern Electric Co.

Dr. von Baeyer

ENGINEERING 454. *Electromagnetic Fields and Materials*

Electromagnetic fields: vector analysis, Gauss's Law, conductors in electrostatic fields, nature of dielectric materials, boundary conditions, Poisson's and Laplace's equations, field mapping, relaxation method, Stokes' theorem, vector magnetic potential, magnetic materials and boundary conditions, time varying fields and Maxwell's equations. Charged particles, relativistic effects. Electromagnetic materials: complex permittivity and permeability, polarization and magnetization, dielectrics, electromagnetic waves on boundaries, magnetic moments, spin moment, quenching of orbital angular momentum, ferromagnetism, ferrimagnetism, magnetic anisotropies, magnetization processes, Weiss domain structure, Bloch walls, ferromagnetic resonance, dielectric and magnetic measurements.

Lectures 2 hours a week, *second* term.

Problem analysis 3 hours alternate weeks, *second* term.

TEXTS: Hayt, *Engineering Electromagnetics*.

von Hippel, *Dielectric Materials and Applications*.

Smit and Wijn, *Ferrites*.

REFERENCE: Martin, *Physical Basis for Electrical Engineering*.

ENGINEERING 455. *Feedback Control Systems*

Open and closed loop control systems. The response of first and second order systems to unit-step, ramp and harmonic commands. Dimensionless parameters, the Nyquist and Nichols loci. Error-rate, output-derivative and integral-error control. The transfer functions. The frequency-domain approach to system analysis. Open loop plots, stability, gain and phase margins. The closed loop frequency transfer function. Compensation. The Nyquist Stability Criterion. Introduction to the Root-locus approach.

Lectures 3 hours a week, *first* term.

Laboratory 3 hours alternate weeks, *first* term.

TEXT: Del Toro and Parker, *Principles of Control Systems Engineering*.

Professor Gullen

ENGINEERING 457. *Electronics I*

Electron ballistics. Conduction in metals and semiconductors. Thermionic emission. The thermionic vacuum diode and the semiconductor diode. Photoelectric devices. Vacuum triode and transistor triode characteristics. Linear equivalent circuits. Vacuum tetrode and pentode characteristics. The transistor at High Frequency. Electrical discharge in gases and gas-filled tubes. Rectifiers and power supplies. Small signal and audio power amplifiers employing tubes and transistors. Magnetic amplifiers. Feedback amplifiers and oscillators.

Lectures 3 hours a week, *second* term.

Problem analysis and laboratory demonstrations 3 hours a week, *second* term.

TEXT: Millman, *Vacuum-tube and Semiconductor Electronics*.

REFERENCE BOOK: Terman, *Electronic and Radio Engineering*.

Professor Gullen

ENGINEERING 458. *Electronics II*

The work of Engineering 457 is continued in a two-part study of basic aspects of electronic circuit theory, each part occupying approximately one term. Topics associated with radio-communications systems are discussed in Part I and include modulation and modulating systems, radio frequency amplifiers, noise, oscillators and automatic frequency control, frequency changing, automatic gain control, limiting and demodulation. Topics associated with pulse and data processing systems are discussed in Part II and include the cathode follower, monostable, bistable and astable multivibrators, the blocking oscillator, synchronisation and frequency division, counters, pulse amplifiers, voltage and current time-base generators.

Lectures 2 hours a week, *both* terms.

Laboratory 3 hours a week, *first* term; 3 hours alternate weeks, *second* term.

REFERENCE BOOKS: Schwartz, *Information Transmission, Modulation and Noise*.
Millman and Taub, *Pulse and Digital Circuits*.

Professor Gullen

ENGINEERING 459. *Automatic Data Processing*

The stored program concept and computer block diagram, magnetic tape, magnetic drum and core storage. Introduction to programming; machine language, loops, branching operations, loops within loops and flow charts. Round-off and truncation errors. Fixed and floating point arithmetic. Symbolic programming, translation and assembly. Automatic coding, rules for forming expressions, hierarchy of operations, nesting. Selected topics in numerical analysis including iterative methods of root finding, evaluation of integrals, the solution of linear equations. The use of the electronic analogue computer is discussed and demonstrated in the laboratory.

Lectures 2 hours a week, *second* term.

Laboratory 3 hours alternate weeks, *second* term.

TEXTS: Wrubel, *A Primer of Programming for Digital Computers*.

Stanton, *Numerical Methods for Science and Engineering*.

Professor Gullen

ENGINEERING 491. *Field Trip*

An inspection tour of research laboratories, industries, hydroelectric installations, etc., of about one week duration at the end of the second term.

Members of the Staff

ENGINEERING 492. *Summer Essay*

All students entering the fourth year of the engineering program must submit a summer essay. The summer essays are normally written on a topic drawn from the experience gained by the student during his summer employment.

Members of the Staff

ENGINEERING 495. *Engineering Seminar*

Seminars on engineering design, construction, production, research, economics, contracts, etc., arranged for fourth year students and staff members.

Members of the Staff and guest lecturers

ENGINEERING 496. *Engineering Analysis*

This course is devoted to the analysis of engineering problems with emphasis on numerical methods, physical principles and synthesis. Detailed attention is given to the use of approximations, solution procedures and the interpretation of the results from the physical, mathematical and economic point of view. The objectives of the course are achieved, in part, through the use of case studies.

Lectures 2 hours a week, *both* terms.

REFERENCES: ver Planck and Teare, *Engineering Analysis*.

Li, *Engineering Analysis*.

Ryder, *Creative Engineering Analysis*.

ENGINEERING 497. *Engineering Project*

As a part of the fourth year program, each student is required to select and complete a major project in engineering analysis, design, development, or research. The objective is to provide an opportunity to develop initiative, self reliance, creative ability, and engineering judgment. The results must be submitted in a comprehensive report with appropriate drawings, charts, bibliography, etc. Each student is expected to devote at least 200 hours to his engineering project.

Project work 5 hours a week, *both* terms.

Members of the Staff

GRADUATE COURSES

The School of Engineering offers graduate courses leading to a Master's degree in the fields of Aeronautical Engineering and Electrical Engineering. Further information regarding the graduate courses can be obtained from the School of Engineering.

ENGLISH LANGUAGE AND LITERATURE

<i>Professor; Chairman of the Department, 1961-62</i>	Munro Beattie, A.M., Ph.D.
<i>Professor</i>	G. B. Johnston, M.A.
<i>Associate Professors</i>	R. L. McDougall, M.A., Ph.D. G. J. Wood, M.A.
<i>Assistant Professor</i>	Michael Hornyansky, M.A.
<i>Lecturers</i>	Benjamin Jones, A.M., Ph.D.
<i>Sessional Lecturers</i>	Douglas Wurtele, B.A. Dolores Bedingfield, M.A.
<i>Instructors</i>	Ruth M. Underhill, M.A., Mary Anne Phillips, M.A., Belle Elliot, B.A., Edwina Carson, B.A., Jean Collins, M.A.

The objectives for students who elect English as their major or honours subject are as follows:

1. to become acquainted with the chief works of the principal authors;
2. to understand the main developments in language, ideas, and genre;
3. to acquire standards of literary judgment, appreciation, and expression.

MAJOR IN ENGLISH: Every student who elects English as his major subject will plan his program in conference with a representative of the department. The required courses in English are as follows:

in the First year, English 221;

in the Second year, English 300 and English 321;

in the Third year, English 421; and two or three additional courses in English, to be taken in the Second and Third years.

A comprehensive examination will be written in the final year.

HONOURS IN ENGLISH: An honours student will plan his program in conference with the chairman of the department. The curriculum for honours in English comprises a number of courses which are restricted to honours students, besides those which are taken with major students. The following courses will be obligatory: English 221, 300, 321 and 421 with the major students, English 310, 326 and 360 as courses restricted to honours students. Five additional courses in English will be required, four of which must be honours courses. At least six courses in other subjects should be taken, which should include history, philosophy, and a language other than English; in any subject selected, more than one course should be taken.

Provision may be made in the final year for independent study in a field of concentration of the student's own choice, such as the following: the novel, comparative literature, criticism, Old and Middle English, Canadian history and culture. A graduating essay will be presented on the approved topic, upon which the student will be examined orally.

At the end of the final year the candidate for an honours degree in English language and literature must show satisfactory performance in a written comprehensive examination. A list of the authors and texts in which he is to be examined may be obtained from the chairman of the department.

Combined honours courses may be taken in English and German, and English and French.

(For information regarding preparation for admission to the Ontario College of Education for the Interim High School Assistant's Certificate, Type A, students are invited to consult the Registrar.)

SUMMARY OF COURSES

General courses:

English 111, 120, 210, 230, 365.

Course common to Major and Honours Students:

English 221, 300, 321, 421.

Major courses:

English 305, 320, 325, 327, 330, 340, 348, 349, 350, 311 (terminates 1961-62).

Honours courses (except by permission of the Department):

English 310, 312, 315, 317, 322, 323, 324, 326, 328, 332, 342, 345, 346, 352, 355, 360.

N.B.: Courses in italics are given in the current year.

ENGLISH 111. *Composition and Grammar*

Half course.

ENGLISH 120. *Literature and Composition*

The course comprises two parts: (a) the study of selected plays, poems, short stories, essays, and a novel; (b) a systematic study of the art of writing English prose. Neither part may be taken separately, unless, in rare cases, with the permission of the department. A student whose attendance and work are irregular in either part of the course may be denied permission to write the final examination.

Day Division: Annually (classes four hours a week, practice period one or more hours a week).

Mrs. Underhill

Evening Division: 1961-62 (classes four hours a week).

Mrs. Phillips

ENGLISH 200. *Literary Studies (See English 300)*

ENGLISH 210.[2]. *English Authors from Chaucer to T. S. Eliot*

A study of selected masterpieces in English literature from the fourteenth to the twentieth century—a course for students who do not elect English as a major subject. Essay-writing and regular participation in discussion groups are required.

TEXTS:

C. W. Dunn (ed.), *A Chaucer Reader*; Shakespeare, *Antony and Cleopatra*; Milton, *Paradise Lost*; Swift, *Gulliver's Travels*; Pope, *Selected Poems* (Rinehart); Austen, *Emma*; Wordsworth, *The Prelude and Selected Poems* (Rinehart); Dickens, *Great Expectations*; Twain, *Huckleberry Finn*; Shaw, *Caesar and Cleopatra*; T. S. Eliot, *Selected Poems* (Faber); Leacock, *Sunshine Sketches of a Little Town*; E. J. Pratt, *Ten Selected Poems*.

PREREQUISITE: English 120 or equivalent.

Day Division: Annually (lectures two hours a week, group discussion one hour a week).

Professor Hornyansky, Dr. Jones, and assistants

Evening Division: Not offered, 1961-62.

ENGLISH 221. *Mediaeval and Renaissance English Literature*

Authors studied will include Chaucer, Malory, Spenser, Marlowe, Shakespeare, Jonson, Webster, Donne, minor poets, Milton and Bunyan.

Day Division: Annually (lectures three hours a week, group discussion one hour a week).

For Honours and Major students.

Professor Wood and members of the department

ENGLISH 230. *English for Engineering Students. (Credit for this course in the Engineering program only).*

Mrs. Bedingfield

ENGLISH 300. [formerly English 200]. *Studies in Language and Literary Forms*

A variety of texts will be read, with a view to an understanding of critical procedures and principles. Considerable attention will be given to language, prosody, bibliography, genres and methods of analysis.

Not offered, 1961-62.

ENGLISH 305. [S1]. *Classicist of the Western Tradition*

Reading, in English translation, of passages from *The Iliad* and *The Odyssey*; Agamemnon, Oedipus Rex, Hippolytus, Phaedra (Seneca), Phèdre; *The Aeneid*; *The Divine Comedy*. (Half course). (This course is also listed as Classical Civilization 305.)

PREREQUISITE: By permission of the Department.

Not offered, 1961-62.

ENGLISH 310. [8b]. *Old English*

A study of Old English language and literature including grammar and phonology, and translation of selections of Old English prose and poetry.

TEXTS: *Sweet's Anglo-Saxon Primer*. Ninth Edition, rev. Davis; and selected texts.

Day Division: (lectures three hours a week).

PREREQUISITE: For honours students.

Professor Johnston

ENGLISH 311. *History of the English Language.*

A course for honours English students and English majors, to be taken in the final year. A departmental requirement which carries no university credit.

Day Division: (lecture one hour a week).

Not offered after 1961-62.

Professor Johnston

ENGLISH 312. *Old English Poetry*

Translation and study of the text of *Beowulf* and the *Finnsburg Fragment*.

TEXT: *Beowulf and the Fight at Finnsburg*, ed. Klaeber. Third edition.

Day Division: (lectures three hours a week).

Professor Johnston

ENGLISH 315. [9]. *Middle English*

A study of the English language and literature between the Norman Conquest and the fifteenth century. Special attention is given to fourteenth-century literature exclusive of Chaucer. Dickens and Wilson, *Early Middle English Texts*; Sisam, *Fourteenth Century Verse and Prose*; Sir Gawain and the Green Knight, ed. Tolkien and Gordon; *Piers Plowman*, *Passus I-VII*, ed. Skeat.

PREREQUISITE: For honours students.

Day Division: (lectures three hours a week).

ENGLISH 317. [S2]. *Chaucer*

Completion of the study of Chaucer's works begun in English 320. (Half course).

Day Division: Second term, seminar two hours a week.

Professor Johnston

ENGLISH 320. [4]. *Chaucer, Spenser, and Milton*

TEXTS: F. N. Robinson (ed.), *Chaucer's Complete Works*

Smith and De Selincourt (ed.), *The Poetical Works of Edmund Spenser*

Hughes (ed.), *John Milton, Complete Poems and Major Prose*.

Day Division: lectures three hours a week.

Professors Johnston and Wood

ENGLISH 321. *Restoration, Eighteenth Century, and Romantic Literature*

Survey for major and Honour students, of the period from Dryden to Keats.

Not offered, 1961-62.

ENGLISH 322. [S5]. *Spenser and Milton*

Special consideration of *The Faerie Queene* and *Paradise Lost*. (Half course).

Day Division: Second term, seminar two hours a week.

Professor Wood

ENGLISH 323. [220]. *Renaissance Prose and Poetry*

An intensive examination of the origins and development of the English Renaissance. (1500 - 1660)

TEXTS: To be announced.

PREREQUISITE: English 200 or equivalent.

Day Division: lectures three hours a week.

Professor Wood

ENGLISH 324. [S6]. *Drama in England until 1642*

Study of the development of dramatic production and literature from the middle ages to the closing of the theatres in 1642. Reading of representative plays. (Half course.)

Not offered, 1961-62.

ENGLISH 325. *English Drama to 1642 (with emphasis on Shakespeare)*

A study of the mediaeval origins of English drama; miracle and morality plays; the drama and stage of the English Renaissance, to the closing of the theatres in 1642.

Not offered, 1961-62.

ENGLISH 326. [6]. *Life and Works of Shakespeare*

A study of the mediaeval origins of English drama, its development to and through the sixteenth and early seventeenth centuries, a survey of theatrical conditions of the Elizabethan period; intensive study of Shakespeare's environment and development as a dramatist, with careful reading of certain plays.

PREREQUISITE: English 200 or 210.

Evening Division: lectures two hours a week.

Professor Beattie

ENGLISH 327. *Seventeenth Century Literature*

Not offered, 1961-62.

ENGLISH 328. [16]. *Shakespeare and Milton*

Not offered, 1961-62.

ENGLISH 330. [15a and 15b]. *Restoration and Eighteenth Century Literature*

The poetry and prose of English neoclassicism, focusing on the work of Dryden, Pope, Swift, and Johnson; including the development of prose style, and the shift from classic to romantic.

PREREQUISITE: English 200, 210 or 220.

Day Division: 1961-62 (lectures three hours a week).

Dr. Jones

ENGLISH 332. *Restoration and Eighteenth Century Drama*

PREREQUISITE: For honours students. (Half course).

Offered as a reading course, Summer; 1961.

Dr. Jones

ENGLISH 340. *Nineteenth Century Literature*

The major Romantic and Victorian poets from Wordsworth to Swinburne. Contemporary prose by Wordsworth, Coleridge, Carlyle, Newman, Mill, Arnold, Butler.

PREREQUISITES: English 200, 210, or 220.

Day Division: 1961-62 (lectures three hours a week).

Professor Hornyansky

ENGLISH 342. [S9]. *Nineteenth Century Thought*

Readings in the Romantic and Victorian periods, emphasizing ideas on culture, society, and the uses of literature; Coleridge, Carlyle, Ruskin, Newman, Mill, and Arnold receive special attention.

PREREQUISITE: For honours students; others by permission of the instructor.

Day Division: 1961-62 seminar, three hours a week.

Dr. Jones

ENGLISH 345. [7]. *American and Canadian Literature*

A study of important stages in the development of the literatures of the United States and Canada, from colonial times to the present day, to provide the basis for an exploration of fundamental similarities and differences between the literary cultures of the two countries.

Not offered, 1961-62.

ENGLISH 346. *American Literature*

Readings from selected authors in *The American Tradition in Literature* (Shorter Edition; Bradley, Beatty and Long), with special attention given to Emerson, Poe, Thoreau, Whitman, Dickinson, Howells, Frost, Eliot, Faulkner, Dos Passos. The following texts will also be studied: *The Autobiography of Benjamin Franklin*; Hawthorne, *The Scarlet Letter*; Melville, *Moby Dick*; Clemens, *Huckleberry Finn*; James, *The Portrait of a Lady*; Crane, *The Red Badge of Courage*; Lewis, *Babbitt*; Fitzgerald, *The Great Gatsby*; Hemingway, *Farewell to Arms*.

PREREQUISITES: English 200 or 210.

Day Division: 1961-62 (lectures three hours a week).

Professor McDougall

ENGLISH 348. *Canadian Poetry*

Selected readings from *Canadian Anthology* (eds. Klinck and Watters), with special attention given to the poetry of Lampman, D. C. Scott, Pratt, and Klein. Supplementary readings from *L'Ame de la poésie canadienne-française* (ed. Rièse). (Half course).

PREREQUISITES: English 200 or 210.

Not offered, 1961-62.

ENGLISH 349. *The Canadian Novel*

Selected readings in prose from *Canadian Anthology* (eds. Klinck and Watters), and the following texts: Haliburton, *The Clockmaker*; Grove, *Our Daily Bread*; Callaghan, *The Loved and the Lost*; MacLennan, *The Watch that Ends the Night*; Ethel Wilson, *The Equations of Love*; Ross, *As For Me and My House*; Raddall, *His Majesty's Yankees*; Davies, *Leaven of Malice*; Leacock, *Sunshine Sketches of a Little Town*; Ringuelet, *Trente arpents*; Gabrielle Roy, *Bonheur d'occasion*. (Half course).

PREREQUISITES: English 200 or 210.

Not offered, 1961-62.

ENGLISH 350. [3]. *Major Twentieth-Century Authors*

A survey of themes, forms, and literary relationships since 1885.

TEXTS:

Oscar Williams (ed.), *A Little Treasury of Modern Poetry*; Butler, *The Way of All Flesh*; Wilde, *The Picture of Dorian Grey*, *Salome*, *The Importance of Being Earnest*; Shaw, *Mrs. Warren's Profession*, *Man and Superman*, *Major Barbara*; Synge, *The Playboy of the Western World*; O'Casey, *Juno and the Paycock*; T. S. Eliot, *Murder in the Cathedral*; Conrad, *Heart of Darkness*; E. M. Forster, *A Passage to India*; Bennett, *The Old Wives' Tale*; Joyce, *A Portrait of the Artist as a Young Man*; Lawrence, *Sons and Lovers*; Woolf, *To the Lighthouse*; Aldous Huxley, *Point Counter Point*.

PREREQUISITES: English 200 or 210.

Not offered, 1961-62.

ENGLISH 352. [S3]. *Contemporary Texts*

A detailed and analytic study of several difficult twentieth-century works, notably *Ulysses*, *The Waste Land*, *Four Quartets*, and poems by W. H. Auden and Dylan Thomas.

PREREQUISITE: English 210, 220, or permission of the instructor.

Day Division: (lectures three hours a week).

Professor Beattie

ENGLISH 355.[17]. *The English Novel*

The development of the art of fiction in English literature, from its beginnings in the eighteenth century, through the major Victorian novelists, to the chief authors of the twentieth century.

PREREQUISITE: English 200 or 210.

Day Division: (lectures three hours a week).

Professor Beattie

ENGLISH 360.[S7]. *Literary Criticism from Aristotle to the Present*

TEXT: W. J. Bate, *Criticism: the Major Texts*.

PREREQUISITE: Honours students; others by permission of the Department.

Day Division: (lectures three hours a week).

Professor McDougall

ENGLISH 365. *Writing Seminar*

A non-credit seminar in writing, involving regular assignments in various genres, and practical criticism based on this work. Whether the course is offered in a given year, and whether it concentrates on prose or verse, will depend upon the enrolment.

PREREQUISITE: Permission of the instructor.

Day and Evening Division: Seminar one hour a week.

Professor Hornyansky

ENGLISH 421. *Victorian and Modern Literature*

Survey for major and honours students of the period from Tennyson to the present, including American authors.

Not offered, 1961-62.

GRADUATE COURSES

The Department of English will, where it is possible, provide programs of studies leading to the degree of Master of Arts in English Language and Literature. Such programs will be planned with regard both to each candidate's special requirements and to the library facilities available. (See also pp. 70-72).

A candidate for the M.A. degree must have completed the requirements of an Honours B.A. degree in English Language and Literature or have similar qualifications. By departmental permission, certain of these requirements may be completed after the candidate has been admitted as a graduate student.

At least four months before he comes up for the degree, the candidate must pass a comprehensive examination in English Literature. Ordinarily this examination will be available in January of each year.

The student must obtain at least B standing in each of three graduate courses and must pass an oral examination on his thesis.

Several courses may be offered each year from among those listed below. For details, consult the chairman of the English department.

COURSES OF STUDY

ENGLISH 511. *Beowulf*

ENGLISH 516. *Poetry in the Fourteenth Century*

ENGLISH 521. *Donne and Browne*

ENGLISH 524. *Elizabethan and Jacobean Drama*

ENGLISH 526. *Shakespeare*

ENGLISH 527. *Milton*

ENGLISH 530. *Eighteenth Century Poetry*

ENGLISH 535. *Eighteenth Century Prose*

ENGLISH 539. *The Romantic Movement*

ENGLISH 546. *Tennyson and Browning*

ENGLISH 551. *British and American Poetry Since 1900*

ENGLISH 558. *Major American Authors of the Nineteenth Century*

ENGLISH 560. *Henry James and the Modern Novel*

(See also the announcement of the Institute of Canadian Studies, p. 73).

FINE ARTS

Sessional Lecturer (Art) J. K. B. Robertson, M.A.
Sessional Lecturer (Music) Carman H. Milligan, Mus.Bac., M.Mus.

Courses in the history of art are offered by Carleton University in co-operation with the National Gallery of Canada. The collections and study materials of the National Gallery afford the student unusual opportunities for direct observation.

The sequence of courses for academic credit is temporarily suspended.

ART

FINE ARTS 210.[1]. *An Introduction to Art History*

An introduction to the analysis of works of art, in the first term, followed, in the second, by a comparative survey of European architecture, sculpture and painting since prehistoric times.

FINE ARTS 305. *Classical and Mediaeval Art*

Architecture, sculpture, and painting of the Greeks and Romans to the fall of the Roman Empire, and European art from early Christian to Gothic times.

PREREQUISITE: Fine Arts 210 or permission of the instructor.

FINE ARTS 310.[3]. *Renaissance and Baroque Art*

European architecture, painting, and sculpture from the fifteenth to the eighteenth century.

PREREQUISITE: Fine Arts 210 or permission of the instructor.

FINE ARTS 325. *Modern Art*

European painting from 1800 to the present day, with reference also to sculpture and architecture, followed by a survey of Canadian art.

PREREQUISITE: Fine Arts 210 or permission of the instructor.

MUSIC

FINE ARTS 260.[Music 1]. *Introduction to Music*

A general survey of music history from 1400 to 1900 A.D. It will include preliminary studies in musical analysis, orchestral instruments, and score reading.

TEXT: Bernstein, *Introduction to Music*.

PREREQUISITE: Permission of the instructor.

FINE ARTS 365. *Music in the Middle Ages (to 1450); The Renaissance in Music (1450-1600).*

The course will commence with a preliminary study of the music of the Greeks and Hebrews. Thereupon, in chronological sequence, the story of musical development will be studied in detail under the following headings: Plainchant; Organum; the origin of the motet and mass; Ars Nova; Dunstable; the Burgundians; the Flemish school; troubadors and trouveres. In the second term, the study will continue, leading to the Renaissance, and noting especially: Josquin; the Flemish chanson groups; Dutch and German organ composers; the Venetian and Roman Schools.

PREREQUISITE: Permission of the instructor.

FINE ARTS 370. *Music in the Baroque Era (1600-1750);*

The Classical Period in Music (1730-1827).

The program of the course will commence with a study of the origin and development of opera as conceived by the Camerata in Florence and continued in Italy by Monteverde, Cavalli and Scarlatti; by Lully and Rameau in France; and by Henry Purcell in England. The great growth in Instrumental Music will also be explored, including the keyboard music of the French Clavecinists and the Italian, Domenico Scarlatti, the German Organ Composers and the Italian orchestra music of the early 1700's. The work of the semester will be culminated by an intensive study of the music of the two greatest composers of the period—Handel and Bach. The second semester will be given over primarily to the rise and growth of the Symphony and other cyclic forms. It will begin with the early symphonists of the Vienna and Mannheim Schools and will move on through the growing consciousness for thematic development as evidenced in the writing of K. P. E. Bach, Haydn, Mozart and Beethoven.

FINE ARTS 375. *Romanticism in Music (1827-1890);*

Twentieth Century Music (1890-the present).

Detailed study and analysis of romantic characteristics in music as evidenced in the music of Schubert, Weber, Mendelssohn, Chopin, Schumann, Brahms, Wagner, Tschai-kowsky.

Commencing with the French impressionists, music of our century will be examined with a view to enunciating some of the principles which seem to govern this new music.

TEXT: Bauer, *Music in the Twentieth Century*.

FRENCH

Associate Professor; Chairman of the Department, 1961-62 J. S. Tassie, M.A., Ph.D.

Assistant Professors C. P. Fleischauer, A.M., Ph.D.

J. E. Blais, L. ès L.

Visiting Professor Pierre Mèlès, D. ès L.

Sessional Lecturers . . . Eva Kushner, Ph.D., Madeleine Mèlès, L. ès Sc.,

S. Bédard, L. en D., G. S. Du Vernet, M.A.

As Carleton University is situated in a bilingual community, students are encouraged to take advantage of the multiple opportunities for practical appreciation of the language. Radio, television, cinema, stage, the press, and everyday conversation are at hand to supplement academic course work. Class lectures are conducted in French as far as is feasible. The Department also has at its disposal a fully equipped language laboratory.

PASS COURSE

Any student intending to major in French should consult the department as soon as possible, in any case *no later than the end of the First year*, to plan his program. This must be done with care in order to prepare the student for a comprehensive examination at the end of his final year.

HONOURS COURSE

Several honours programs are available. Course patterns are designed to assure a balanced appreciation of all periods of French literature, with competence in oral and written expression in the French language.

Interested candidates will note the general regulations governing honours on pp. 67-69. The Department requires in addition that candidates do summer reading, include practical work in the laboratory in *each* year of the program, and sit for a comprehensive examination at the end of the final year.

Honours in French and German (see also p. 68).

Honours in English and French (see also p. 68).

These courses are intended to prepare the student for the corresponding Ontario College of Education courses leading to the Interim High School Assistant's certificate, Type A, and must be planned in close consultation with the departments concerned. General information on O.C.E. requirements may be obtained from the Registrar.

Honours in French. This program is designed for students intending to pursue graduate studies in the field of Romance languages. It normally consists of twenty courses after Grade 13, and will include the study of a second language other than English each year.

In the First Year the following courses will be chosen:

English 210;

Philosophy 215;

History 220;

French 220;

a course in German (or Spanish or Russian or Latin*);

a First year course in science or mathematics**.

Senior courses will include:

8 or more additional course credits in French;

3 or more additional course credits in German (or Spanish or Russian or Latin);

a further course (or courses) in: English, History, Philosophy, Classics, or Psychology.

Courses offered 1961-62: 110, 220, 302, 304, 315, 320, 410; on demand: 470, 505, 520.

FRENCH 110. [1]. *Readings in Modern French*

The novel and short story by authors of the nineteenth and twentieth centuries. Grammar, translation, oral practice.

TEXTS: Sonet and Shortliffe, *Standard French* (Harcourt Brace)

Salvan, *Images de l'homme* (Harcourt Brace)

Day Division: Annually (lectures three hours a week).

Evening Division: Annually (two lectures a week).

Members of the Department

FRENCH 220. *French Literature and Culture*

Brief but inclusive review of the development of French literature, with emphasis on reading and study of representative literary works of all types. Composition and oral practice for students intending to major in French.

TEXTS: Sonet and Shortliffe, *Standard French* (Harcourt Brace)

Schinz, *Nouvelle Anthologie française* (Harcourt Brace)

Gide, *La Symphonie pastorale*

Sartre, *Les Mains sales*

REFERENCE TEXT: Churchman and Young, *French Literature in Outline*.

PREREQUISITE: French 110.

Day Division: Annually (lectures three hours a week; practice sessions to be arranged).

Evening Division: Annually (two lectures a week).

Summer 1961 (two lectures a week).

Members of the Department

*Latin 110 must be taken before graduation.

**Students are expected to take a science course before graduation. This requirement of the First year may be fulfilled in the Second year.

FRENCH 301. *Le français oral* (Half course)

Phonétique et conversation; travaux de laboratoire.

TEXTS: *Petit Larousse illustré*

Gregg, *A Student's Manual of French pronunciation* (Macmillan)

PREREQUISITE: French 220.

Not offered, 1961-62.

FRENCH 302. *Conversation et traduction* (Half course)

Cours de conversation avancée; l'art de la traduction; travaux de laboratoire.

TEXTS: *Petit Larousse illustré*

Whitmarsh, *Complete French Course* (Longmans Green)

Picard et Black, *Manuel de conversation française* (Heath)

PREREQUISITE: French 301 or permission of the Department.

Day Division: 1961-62 (two hours a week throughout the year).

Professor Tassie and Mme Bédard

FRENCH 303. *Stylistique*

Problèmes de traduction et de syntaxe; analyse des procédés stylistiques.

TEXTS: *Petit Larousse illustré*

Marouzeau, *Précis de stylistique française*

PREREQUISITE: French 302 or permission of the Department.

Not offered, 1961-62.

FRENCH 304. *Explication de texte*

Examen détaillé d'un petit nombre de chefs-d'oeuvre littéraires pour développer l'art de l'explication de texte.

TEXTS: Montaigne, *Essais*

Rousseau, *Rêveries d'un promeneur solitaire*

Valéry, *Charmes*

PREREQUISITE: French 302 or permission of the Department.

Day Division: 1961-62 (three lectures a week).

Professor Blais

FRENCH 310. *La littérature et la pensée françaises du 17^e siècle*

La première génération des grands classiques; la deuxième génération. La querelle des Anciens et des Modernes.

TEXTS: Lagarde et Michard, *XVII^e Siècle* (Bordas)

Corneille, *Polyeucte*

Racine, *Britannicus*

Molière, *Les Femmes Savantes*

REFERENCE TEXT: Lanson et Tuffrau, *Manuel d'histoire de la littérature française* (Heath)

PREREQUISITE: French 220.

Not offered, 1961-62.

FRENCH 315. *La littérature et la pensée françaises du 18^e siècle*

Prolongement du classicisme. Les nouvelles idées politiques, sociales, religieuses, philosophiques.

TEXTS: Fellows and Torrey, *The age of Enlightenment* (Crofts)

PREREQUISITE: French 220.

Evening Division: 1961-62 (two lectures a week).

Professor Fleischauer

FRENCH 317. *La littérature et la pensée françaises du 19e siècle*

Romantisme, réalisme et symbolisme. Le roman, le théâtre, la poésie.

TEXTS: Guthrie and Diller, *French Literature and Thought since the Revolution*
 Borgerhoff, *Nineteenth Century French Drama*
 Galand and Cros, *Nineteenth Century French Poetry*

PREREQUISITE: French 220.

Not offered, 1961-62.

FRENCH 320. [4]. *Littérature française contemporaine*

Du symbolisme et du naturalisme à nos jours. Etude détaillée d'un choix d'oeuvres parmi les grands écrivains représentatifs d'aujourd'hui.

TEXTS: Gendrot et Eustache, *Auteurs français du 20e siècle*
 Simon, *Histoire de la littérature française au 20e siècle*
 G. Lanson, *Histoire de la littérature française*

PREREQUISITE: French 310 or 315 or 317.

Day Division: 1961-62 (three lectures a week).

Professor Mélése

FRENCH 330. [5]. *Littérature canadienne de langue française*

Le roman et la poésie; le folklore, la presse. Etude de la littérature canadienne faite à la lumière des mouvements tant français qu'américains.

TEXTS: Laure Rièse, *L'Ame de la poésie canadienne française*
 Choix des romans importants depuis *Les Anciens Canadiens*

REFERENCE TEXT: Tougas, *Histoire de la littérature canadienne-française*

PREREQUISITE: French 310 or 317 or permission of the department.

Not offered, 1961-62.

FRENCH 345. *Histoire de la littérature française* (Half course)

TEXTS: Braunschvig, *Notre littérature étudiée dans les textes* (3 vols.)

G. Lanson, *Histoire de la littérature française*

PREREQUISITE: French 310 or 315 or permission of the department.

Not offered, 1961-62.

FRENCH 346. *Histoire de la civilisation française* (Half course)

TEXTS: Seignobos, *Histoire sincère de la nation française*

Ledésert and Smith, *La France*

PREREQUISITE: French 310 or 315 or permission of the department.

Not offered, 1961-62.

FRENCH 360. *Le roman français*

Le développement du roman français depuis son inauguration jusqu'à nos jours. Les auteurs à étudier seront choisis dans la liste suivante: Honoré d'Urfé, Mme de La Fayette, Scarron, Lesage, Bernardin de Saint-Pierre, Rousseau, Voltaire, Balzac, Chateaubriand, Constant, Flaubert, Mérimée, Sand, Stendhal, Zola, Saint-Exupéry, Mauriac.

REFERENCE TEXT: Lanson et Tuffrau, *Manuel d'histoire de la littérature française* (Heath)

PREREQUISITE: French 310 or 315 or permission of the department.

Not offered, 1961-62.

FRENCH 405. *L'ancien français*

Les origines de la langue; étude de la littérature du Moyen Age.

TEXTS: Pope, *From Latin to modern French*
 Bartsch, *Chrestomathie de l'ancien français*

PREREQUISITE: French 310 and Latin 110.

Not offered, 1961-62.

FRENCH 410. *La littérature de la Renaissance*

Début de l'ère moderne: l'humanisme; les innovations littéraires du 16^e siècle. Etude particulière de Rabelais, Montaigne, et la Pléiade.

TEXTS: G. Lanson, *Histoire de la littérature française*

Lagarde et Michard, *XVI^e Siècle* (Bordas)

Classiques Larousse: Marot, Ronsard, Du Bellay, Montaigne, Rabelais

PREREQUISITE: French 310.

Day Division: 1961-62 (three lectures a week).

Professor Mélése

FRENCH 470. *Seminar on a topic of French literature*

Examination of a particular theme or area in French studies by directed readings and papers. Intended primarily for honours and graduate students.

Day Division: 1961-62 (three lectures a week).

FRENCH 480. *Tutorial*

Directed study, including essays, designed to fill special needs of individual students at the senior undergraduate or graduate level.

GRADUATE STUDIES

The Department will consider applications for study leading to the M.A. degree in fields for which adequate facilities are at hand. The courses listed below are currently available; the student may be directed, however, to select certain of these in combination with others, e.g., French 470 or French 480. Attention is also drawn to the general regulations found on pp. 70-72.

FRENCH 505. *Introduction to Romance philology*

A course designed to show the historical development of the French language and its relations with the other Romance languages.

FRENCH 520. *Le roman canadien de langue française*

Etude détaillée de quelques-uns des romanciers les plus importants du Canada français. Ce cours forme le complément du cours suivant (French 521) et du cours, "The Canadian Novel". (See p. 74.)

FRENCH 521. *La poésie canadienne de langue française*

Examen sérieux de l'oeuvre de quelques poètes parmi les plus importants du Canada français. Ce cours forme le complément naturel du cours précédent (French 520) et du cours "Canadian Poetry". (See p. 74.)

FRENCH 540. *Penseurs et réformateurs du 18^e siècle français*

Montesquieu et le relativisme, les idées de Voltaire sur la tolérance et la liberté, Diderot et le matérialisme, Rousseau théoricien de la politique et de la pédagogie.

GEOGRAPHY

Associate Professor; Chairman of the Department, 1961-62 . . . G. C. Merrill,
M.A., Ph.D.

Assistant Professor J. Peter Johnson, Jr., A.M.

Sessional Lecturer Robert M. Bone, M.A.

EARTH SCIENCE 200.

The evolution of the continents; rocks and minerals; mountain building and deformation; the cycle and agents of erosion; climatology; oceanography; the genetic study of land forms.

TEXTBOOK: Arthur Strahler, *Physical Geography*

Supplementary reading to be announced.

Day Division: 1961-62 (lectures two hours a week, laboratory two hours a week, two field excursions).

Professor Johnson

GEOGRAPHY 212. *Physical Geography*

Climatology; oceanography; the genetic study of land forms.

REFERENCE TEXT: Arthur Strahler, *Physical Geography*.

Day Division: 1961-62 (lectures two hours a week, laboratory two hours a week, two field excursions, *second term*).

Professor Johnson

GEOGRAPHY 310. *Principles of Geomorphology*

A systematic study of the origin and evolution of relief features of the earth. The application of existing concepts and methods of investigation to problems in interpretation will be emphasized, and geomorphic processes active in northern areas will be studied in detail.

TEXT: Thornbury, *Principles of Geomorphology*.

REFERENCE TEXT: Flint, *Glacial and Pleistocene Geology*.

PREREQUISITE: Earth Science 200 or Geology 210.

Day Division: 1961-62 (lectures two hours a week, laboratory two hours a week, two field excursions).

Professor Johnson

GEOGRAPHY 315. *North America*

This course outlines the physical, historical, and economic geography of North America as a whole. Principal regions of the continent are dealt with in detail.

REFERENCE TEXTS: Alfred J. Wright, *United States and Canada*, 2nd edition.

Miller, Parkins, and Hudgins, *Geography of North America*, 3rd edition.

PREREQUISITE: Earth Science 200, or Geography 212.

Not offered, 1961-62.

GEOGRAPHY 320. *Geography of the Humid Tropics*

A comprehensive regional study of the humid tropical environment with special emphasis upon Latin America and the Caribbean. Indigenous economies; development of plantations; agricultural and industrial potentials.

REFERENCE TEXT: Pierre Gourou, *The Tropical World*.

PREREQUISITE: Earth Science 200 or Geography 212.

Day Division: 1961-62 (lectures and discussion three hours a week).

Professor Merrill

GEOGRAPHY 325. *Cartography*

The study and construction of the major map projections; the fundamentals of lettering and map layout; the construction of special purpose maps, such as land use, population, production, etc.

TEXT: Robinson, *Elements of Cartography*, 2nd edition.

PREREQUISITE: Permission of the instructor.

Evening Division: 1961-62 (lecture one hour a week, laboratory four hours a week).

Professor Merrill

GEOGRAPHY 335. *Historical Geography*

A study is made of the relation of man, habitat, and economy of past eras. The role of man as an ecologic dominant is stressed. The geographic setting of the past is reconstructed for a number of societies.

REFERENCE TEXTS: Ralph E. Brown, *Historical Geography of the United States*.

C. L. and E. H. Lord, *Historical Atlas of the United States*.

PREREQUISITES: Earth Science 200, Geography 212, or permission of the instructor.

Day Division: 1961-62 (lectures and discussion, three hours a week).

Professor Merrill

GEOGRAPHY 360. *Soviet Union*

This course deals with the physical and economic geography of the U.S.S.R. Study is made of the climate, vegetation, and soils, with an emphasis upon the regional pattern of economic activity.

TEXT: M. Baransky, *Economic Geography of the U.S.S.R.*

PREREQUISITES: Earth Science 200, or Geography 212, or permission of the Department.

Not offered, 1961-62.

GEOLOGY

<i>Professor</i>	J. E. Riddell, B.Eng., M.Sc., Ph.D., F.R.S.C., F.G.S.A., F.G.A.C.
<i>Assistant Professor; Chairman of the Department, 1961-62</i>	W. L. Young, M.Sc., Ph.D.
<i>Assistant Professor; Curator</i>	P. A. Hill, B.Sc., Ph.D., F.G.S., F.P.S., F.R.G.S.
<i>Assistant Professors</i>	K. Hooper, M.Sc., F.G.S. W. M. Tupper, M.Sc., Ph.D.
<i>Special Lecturer</i>	F. J. Alcock, B.A., Ph.D., F.R.S.C., F.G.S.A.
<i>Sessional Lecturers</i>	Marjorie Allen, M.Sc., R. W. Boyle, Ph.D., F.R.S.C., L. S. Collett, B.Sc., M.A., F. H. McLearn, B.E., Ph.D., F.R.S.C., F.G.S.A., E. R. Niblett, M.Sc., Ph.D., B. R. Pelletier, M.Sc., Ph.D., R. Potter, M.Sc.
<i>Post-Doctoral Research Fellows</i>	G. Y. Chao, M.Sc., Ph.D., J. M. Moore, Jr., Ph.D.
<i>Post-graduate Teaching Fellows</i>	J. L. Davies, M.Sc., M. Dence, B.Sc., A. Y. Smith, M.Sc.

DEPARTMENT OF GEOLOGY

The physical proximity of Carleton University to libraries, research offices, and laboratories of Federal Government agencies such as the Geological Survey of Canada, the Dominion Observatory, the Mines Branch, and the National Research Council, enables undergraduate and graduate students in the Geological Sciences to make close contact with leading workers in the fields of Geology, Geochemistry, and Geophysics. Lectures by visiting scientists and meetings of various technical groups are open to staff and students of the University.

This opportunity of meeting and conferring with specialists in a variety of scientific disciplines is of particular benefit to graduate students.

PASS COURSE

Students intending to major in Geology must satisfy the requirements of the Qualifying University Year and First years of the general B.Sc. program. Geology 210 may be taken in the Qualifying University Year or First year. The normal pattern of courses is Geology 210, plus all 300 courses. In Second year, majors must take Surveying I or Engineering 205 as a prerequisite to Geology 372.

Minor subjects should be Chemistry, Mathematics, Physics, or one of the Biological Sciences. The following subjects are required: Mathematics 200 or 211, Chemistry 210, Physics 200 or 205, and *one* of Biology 200, Botany 210 or Zoology 205. Mathematics 200 and Physics 200 may be taken only by students electing to minor in the Biological Sciences.

Students who intend to enter the Mineral Industry in a professional capacity after graduation, should take additional subjects (400 series) recommended by the Department.

HONOURS COURSE

Honours requirements are:

- 1) At least ten courses in Geology, including 210, all 300 courses, plus selected 400 courses.
- 2) Mathematics 211, and at least one advanced course in Mathematics.
- 3) A total of six or seven courses in Physical or Natural sciences other than Geology, of which four must be in one field.
- 4) Three non-Science, non-Mathematics courses, including one language other than English.

- 5) A geological report on one summer's work to be submitted during, or before, the Fourth year.
- 6) A comprehensive oral examination at the end of the Fourth year.

Selection of the Honours pattern must be made only after consultation with members of the Department.

GRADUATE STUDIES

The Department offers instruction, leading to the degree of Master of Science. Candidates will be required to:

- (a) take such 300 and 400 series courses as may be necessary to provide a suitable background for advanced studies,
- (b) take three 500 series courses selected by the Department,
- (c) prepare a thesis based on the candidate's own research,
- (d) take a comprehensive examination,
- (e) spend at least one year in full time study and research at the University.

Candidates who do not complete the M.Sc. requirements in one year may register for subsequent years as part-time students.

The Department also offers instruction leading to the degree of Doctor of Philosophy in certain fields of Geology. Details may be obtained from the Chairman.

The general regulations governing the program for the degree of Doctor of Philosophy are set out on p. 71 of this Calendar.

Explanation of Course Numbers (Geology)

The Geology course numbering system is laid out as follows:

- 200 series — Introductory subjects taken in Qualifying University year or First year.
- 300 series — Required subjects for Geology majors taking the pass sequence.
- 400 series — Honours sequence subjects some of which may be taken by pass course students with permission of the Department.
- 500 series — Graduate sequence subjects some of which may be taken by honours course students with permission of the Department.

Within each series the subjects are divided into fields of interest as follows:

- 0-8 — General courses or those covering several geological fields of study or research.
- 10-18 — General geology, geomorphology, structural geology.
- 20-28 — Mineralogy, crystallography, ore deposits, mineralography.
- 30-38 — Paleontology, micropaleontology.
- 40-48 — Oceanology and submarine geology.
- 50-58 — Petrology.
- 60-68 — Sedimentation, stratigraphy and correlation.
- 70-78 — Geological techniques.
- 80-88 — Geochemistry and geophysics.
- 90-98 — Theses and research projects.

In the following listing, full undergraduate courses end in '0' or '5', half courses (first term) in '1', '3', or '7', and half courses (second term) in '2', '4', '6', or '8'.

GEOLOGY 210. [2]. *General Geology*

The Earth in space; evolution of the continents; rocks and minerals; mountain building and deformation; the cycle and agents of erosion; the history of life and the growth of geological ideas.

TEXTBOOKS: Longwell, Knopp and Flint, *Outlines of Geology*; Holmes, *Physical Geology*. Supplementary reading to be announced.

Day Division: Annually (lectures two hours a week, laboratory three hours a week, two half day field excursions *first* term, one full day field excursion after the final examinations).

Evening Division: 1961-62 (lectures two hours a week, laboratory three hours a week, two half day field excursions *first* term, one full day excursion after the final examinations). Evening students are required to sit mid-year and final examinations in the day division. Also summer 1961: lectures five hours a week, laboratory four hours a week plus field excursions.

Professor Hooper, Mrs. Allen, and Dr. Alcock

GEOLOGY 311. *Structural Geology*

A systematic study of rock structures, their origins and importance. Laboratory: practical problems. (Half course.)

TEXT: Billings, *Structural Geology*, 2nd ed.

REFERENCE TEXTS: To be announced.

PREREQUISITE: Geology 210.

Day Division: 1961-62 (lectures two hours a week, laboratory three hours a week. *First* term)

Mr. Potter

GEOLOGY 320. [4]. *Mineralogy*

A systematic study of the structure, chemistry, and morphology of crystals; the physical and chemical properties, and recognition of 150 common minerals; and the more important mineral deposits. Laboratory work involves the megascopic examination of crystal models, crystals, minerals; and blowpipe analysis.

TEXT: *Dana's Textbook of Mineralogy*, Revised by William E. Ford, 4th Edition, 1932.

REFERENCE TEXTS: Dennen, *Principles of Mineralogy*

Berry and Mason, *Mineralogy*

Phillips, *Introduction to Crystallography*

PREREQUISITE: Math. 112, Chem. 210. May be taken concurrently.

Day Division: 1961-62 (lectures two hours a week, laboratory three hours a week).

Professor Young

GEOLOGY 330. [5]. *Palaeontology*

The principles of palaeontology; the classification of invertebrates, their morphology and evolutionary history. Reference to the broader phases of palaeobotany and vertebrate evolution. An introduction to the use of invertebrates in stratigraphic interpretation.

TEXT: Shrock and Twenhofel, *Principles of Invertebrate Palaeontology*.

REFERENCE TEXTS: Moore, Lalicker and Fischer, *Invertebrate Fossils*.

Shimer, *An Introduction to the Study of Fossils*.

PREREQUISITE: Geology 210, and Biology 200 or Zoology 205, or permission of the Department.

Day Division: 1961-62 (combined seminars and laboratory five hours a week).

Professor Hooper

GEOLOGY 350.[355]. *Petrology*

An introduction to the basic principles of petrology. The composition, classification, fabric, occurrence, associations, and origin of the igneous, metamorphic, and sedimentary rocks. The elements of thermodynamics, physical chemistry, and phase chemistry as they apply to petrology. Origin and evolution of magmas. Chemical discussion of metamorphic assemblages and processes. The source, transport, and environment of the more important sedimentary rock types.

Laboratory: The principles of optical crystallography. The utilization of the polarizing microscope. Powder immersion techniques. The optical properties of the more common rock forming minerals. Megascopic and microscopic examination of rocks and their constituents.

TEXTS: Turner and Verhoogen, *Igneous and Metamorphic Petrology*.
Krumbein and Sloss, *Stratigraphy and Sedimentation*.
Moorehouse, *The Study of Rocks in Thin Section*.

PREREQUISITE: Geology 320.

Day Division: 1961-62 (combined seminars and laboratory seven hours a week).

Professor Tupper

GEOLOGY 362.[361]. *Stratigraphy*

An introductory course stressing principles and procedure; lithological succession and rock units; biostratigraphy; a critical study of methods of correlation; interpretation of the stratigraphic record and relation of stratigraphy to historical geology; tectonic framework. Selected examples, taken from the North American Palaeozoic and Mesozoic succession, are studied. (Half course).

REFERENCE TEXTS: Dunbar & Rogers, *Principles of Stratigraphy*.
Krumbein & Sloss, *Stratigraphy and Sedimentation*.
Weller, *Stratigraphic Principles and Practice*.
Clark and Stearn, *The Geological Evolution of North America*.

PREREQUISITE: Geology 330, which may be taken concurrently.

Day Division: 1961-62 (lectures and laboratory five hours a week, *second term*).

Dr. McLearn

GEOLOGY 363.[391, 380]. *Precambrian Geology*

An introduction to Precambrian terranes and mineral resources with emphasis on North America. (Half course).

TEXTS: Geology and Economic Minerals of Canada, 4th Edn.
Others to be announced.

PREREQUISITES: Geology 311 and 320, Geology 350 (may be taken concurrently).

Day Division: 1961-62 (lectures 3 hours a week, assignments to be arranged, *first term*).

Professor Riddell

GEOLOGY 372.[371]. *Field Geology*

Techniques of geological mapping; the observation and interpretation of field data; the use of topographic maps and aerial photographs. Writing the geological report. (Half course)

PREREQUISITE: Geology 311; Engineering 205, or Surveying I, or equivalent.

TEXTS: Texts and supplementary reading to be announced.

Day Division: 1961-62 (combined seminars and laboratory two hours a week, *second term*; fifteen days field work in the Spring of 1960 — exact dates to be announced later).

Professor Young

HONOURS COURSES

GEOLOGY 413.[312]. *Geomorphology*

(Offered as Geography 310 Principles of Geomorphology. See Department of Geography).

GEOLOGY 420. [421, 422]. *Metallic and Nonmetallic Mineral Deposits*

The genesis and occurrence of metallic deposits. Controls of mineral localization. Methods of mining and extraction. The precious metals. The nonferrous metals. Ferrous metals. Minor metals.

Classification of mineral deposits. The economics and distribution of the nonmetallic minerals; the mineral fuels; structural materials; ceramics and refractories; industrial and chemical minerals; fertilizers and abrasives; gemstones; groundwater supplies.

TEXT: Bateman, *Economic Mineral Deposits*.

REFERENCE TEXTS: Lindgren, *Mineral Deposits*, Others to be announced.

PREREQUISITES: Geology 311 (or equivalent) Geology 320, and Geology 423 for those majoring in hard rock, and Geology 432 for those in soft rock, geology. Geology 423 and 432 may be taken concurrently.

Day Division: 1961-62 (lectures, laboratories, and seminars five hours a week).

Professor Young and other members of the staff

GEOLOGY 423. [422]. *Mineralography*

The metallographic microscope. The study and recognition of opaque minerals. Microchemical tests. (Half course).

REFERENCE TEXTS: Short, *Microscopic Determination of the Ore Minerals*
Edwards, *Textures of the Ore Minerals*

PREREQUISITES: Geology 350 (which may be taken concurrently).

Day Division: 1961-62 (seminars and laboratory five hours a week, *first term*).

Mr. Smith

GEOLOGY 432. *Micropalaeontology*

Types of microfossils, their historical sequence and biostratigraphic significance. Micropalaeoecology. Local and regional correlation. Laboratory: examination and identifications of microfossils, with special reference to the Foraminifera. (Half course).

TEXT: Jones, *Introduction to Micropalaeontology*.

REFERENCE TEXTS: Cushman, *Foraminifera*.

Glaessner, *Principles of Micropalaeontology*.

PREREQUISITES: Geology 330 and permission of instructor.

Day Division: 1961-62 (combined seminars and laboratory five hours a week, *second term*).

Professor Hooper

GEOLOGY 451. [411]. *Igneous and Metamorphic Petrology*

Introduction to principles of phase equilibria and graphical representation of phase assemblages. Melting relations in silicate systems pertinent to igneous petrology. Physical environment of metamorphic and metasomatic systems. Readings in descriptive and theoretical petrology. Petrographic study of igneous and metamorphic guides in laboratory. (Half course).

TEXTS: Turner & Verhoogen, *Igneous and Metamorphic Petrology*

REFERENCE TEXTS: Bowen, *Evolution of the Igneous Rocks*

Hakker, *Metamorphism*

Korzhinskii, *Physiochemical Basis of the Analysis of the Pargenesis of Minerals*

Other reference texts will be assigned.

PREREQUISITES: Geology 350, preferably Chemistry 310.

Day Division: 1961-62 (seminars and laboratory six hours a week, *first term*).

GEOLOGY 452. [412]. *Sedimentary Petrology*

Composition, texture, primary structure and origin of the major sedimentary rock types. Source, transportation, history, and environment of deposition are interpreted with the aid of petrographic criteria.

REFERENCE TEXTS: Pettijohn, *Sedimentary Rocks*
Krumbein & Pettijohn, *Manual of Sedimentary Petrography*
Shrock, *Sequence in Sedimentary Rocks*
Krumbein & Sloss, *Stratigraphy and Sedimentation*

PREREQUISITES: Geology 350, 461.

Day and Evening Division: 1961-62 (combined seminars and laboratory five hours a week, *second term*).
Dr. Pelletier

GEOLOGY 461. [361]. *Sedimentation*

Weathering processes, transportation of detritus, sedimentary processes, environments of deposition, dispersal patterns and sedimentary trends, grade scales, statistical devices, size analyses, heavy mineral preparation and study. The stereonet. Directional properties of fabric, texture and lithofacies. Regional analyses of primary sedimentary structures, paleogeographic construction, tectonism and sedimentation.

TEXT: To be announced.

REFERENCE TEXTS: To be announced.

PREREQUISITES: Geology 210, 350, and permission of the instructor.

Day and Evening Division: 1961-62 (combined seminars and laboratory five hours a week, *first term*).
Dr. Pelletier

GEOLOGY 471. *Instrumental Analysis*

The theory and techniques of the instrumental methods of analysis, particularly as they apply to analytical problems in the earth sciences. Spectrophotometric analysis, colorimetry, fluorimetry, nephelometry, spectographic analysis, flame photometry, mass spectrometry, X-ray diffraction and fluorescence spectrometry; neutron activation and radiometric analysis. Laboratory—exercises with the instruments to familiarize the student with the operation, use, and limitations of the various methods. Visits to instrumental laboratories in the Ottawa area.

TEXT: Willard, Merritt, and Dean, *Instrumental Methods of Analysis*.

REFERENCE TEXTS: Various reference texts and outside reading.

PREREQUISITES: Permission of the instructor, Chemistry 210.

Day Division: 1961-62 (lectures, seminars, and laboratory six hours per week).
Professor Tupper

GEOLOGY 480. [460]. *Chemistry and Physics of the Earth*

Physical and chemical properties and characteristics of the earth. Inferred physico-chemical processes active throughout geologic time.

TEXTS: Reference texts and outside reading.

PREREQUISITES: Geology 451 or 452 (may be taken concurrently).

Day Division: 1961-62 (lectures three hours a week).

Professor Tupper, Drs. Boyle, Niblett

GEOLOGY 481. [381, 376]. *Exploration Geophysics*

An introduction to the fundamental theory and application of geophysics to economic and structural geology. Laboratory work involves interpretation of geophysical and geological maps. Field work will introduce students to various geophysical instruments. (Half course).

TEXT: Nettleton, *Geophysical Prospecting for Oil*

REFERENCE TEXTS: To be announced.

PREREQUISITES: Physics 205, or permission of the instructor.

Day and Evening Division: 1961-62 (combined lectures, labs, or field trips, five hours a week, *first term*).

Mr. Collett

GEOLOGY 482. [382, 375]. *Applied Geochemistry*

An introductory course; the chemical and physical factors responsible for the distribution and migration of the elements in the lithosphere, hydrosphere, atmosphere, and biosphere; geochemistry applied to mineral exploration. Laboratory work involves determination of trace amounts of the common metallic elements in water, rock, and soil. (Half course).

TEXT: Hawkes, *Principles of Geochemical Prospecting*

REFERENCE TEXTS: Mason, *Principles of Geochemistry*
 Rankama and Sahama, *Geochemistry*
 Goldschmidt, *Geochemistry*
 Sandell, *Colorimetric Determination of Traces of Metals*

PREREQUISITES: Geology 210, 320 (may be taken concurrently), Chemistry 210.

Day Division: 1961-62 (combined lectures and laboratory five hours a week, second term).

Professor Riddell

GEOLOGY 490. *Geological Report*

GRADUATE COURSES

The following courses are available and will be offered as required.

GEOLOGY 500. [441]. *Contemporary Problems in Geology*

Interpretation and evaluation of outstanding problems in Geology. Term paper to be submitted.

Members of the Department

GEOLOGY 509. *Directed Studies*

Studies in fields closely related to the graduate student's thesis problem, under the guidance of selected extramural directors.

GEOLOGY 510. *Geotectonics*

Professor Riddell

GEOLOGY 520. *Advanced Mineral Deposits*

Professor Young

GEOLOGY 530. *Advanced Paleontology*

Professor Hooper

GEOLOGY 540. *Submarine Geology*

Professors Riddell and Hooper

GEOLOGY 550. *Advanced Petrology*

Professor Tupper

GEOLOGY 571. *Laboratory Problems*

Members of the Department

GEOLOGY 580. *Chemistry of the Earth*

Professor Tupper and Dr. Boyle

GEOLOGY 582. *Physics of the Earth*

Dr. Niblett and others

GEOLOGY 590. *M.Sc. Thesis*

Equivalent to two full courses.

GEOLOGY 595. *Ph.D. Thesis*

GERMAN

- Associate Professor; Chairman of the Department, 1961-62* E. M. Oppenheimer,
B.A., A.M., Ph.D.
- Special Lecturer* Margaret Waddams, M.A.
- Sessional Lecturer* John Bruhwiler, B.A.
- Language Lab. Lecturer* Margot Wellmann-Scharpenberg

Students electing German alone or in combination as their *major subject* should consult the department concerning their program.

Two combined Honours Programs are available: *Honours in French and German* (see also p. 68) and *Honours in English and German* (see also p. 68). Both are intended as preparation for Type A certificate courses of the Ontario College of Education. For details, consultation with the University Registrar and departmental chairman is invited.

The language laboratory facilities will be used in German 115, 210, and 311b.

GERMAN 115. Elementary German

An introduction to the essentials of German grammar and composition. Oral practice. Graded and original texts are used. Guidance in the reading of specialized texts is available.
Day and Evening Divisions: 1961-62 (four hours, including one laboratory period a week).

GERMAN 210. [2]. Intermediate German

Reading of representative texts (poetry, drama, and prose fiction) from the 18th, 19th and 20th centuries. Composition and oral practice.

PREREQUISITE: German 115 or equivalent.

Day and Evening Divisions: 1961-62 (four hours, including one laboratory period a week).

GERMAN 311a. Advanced Composition**GERMAN 311b. Conversation**

(Half courses concurrent through the year).

PREREQUISITE: German 210 or equivalent.

Day or Evening Division: 1961-62 (composition two hours a week; conversation two hours a week).

GERMAN 316. [315]. The Age of Goethe I (1750-1790)

Literature of Enlightenment and Storm and Stress with special emphasis on Goethe.

PREREQUISITE: German 210 or equivalent.

Not offered, 1961-62.

GERMAN 317. [315]. The Age of Goethe II (1790-1830)

Classicism; Romanticism; Goethe's later works.

PREREQUISITE: German 210 or equivalent.

Day or Evening Division: 1961-62 (3 hours a week).

GERMAN 320. Medieval Literature and Language (Half course)

PREREQUISITE: German 210 or equivalent.

Not offered, 1961-62.

GERMAN 321. Early Modern German Literature (1500-1700)

History of the Language; Phonetics. (Half course).

Not offered, 1961-62.

GERMAN 322. German Literature of the Nineteenth Century; Composition

Day or Evening Division: 1961-62.

GERMAN 325. German Literature of the Twentieth Century

Shorter selections for orientation and detailed treatment of major representative texts.

PREREQUISITE: German 210 or equivalent.

To be offered, 1962-63.

GERMAN 390. Tutorial on selected topic**GREEK**

(See Classics)

HISTORY

<i>Professor; Chairman of the Department, 1961-62</i>	David M. L. Farr, M.A., D.Phil.
<i>Professor</i>	James A. Gibson, M.A., B.Litt., D.Phil.
<i>Associate Professors</i>	G. S. Couse, B.A. (on leave of absence, 1961-62) S. R. Mealing, M.A., B.Litt.
<i>Assistant Professors</i>	John S. Moir, M.A., Ph.D., D. G. Bowen, M.A.
<i>Instructor</i>	Naomi E. S. Griffiths, M.A.
<i>Sessional Lecturers</i>	Ronald Grantham, M.A., L. C. Clark, M.A., Valerie Knowles, M.A.
<i>Honorary Lecturer</i>	J. M. McQueen, M.A.

Courses in the Department of History are designed in part to enable students to benefit from the unique and extensive resources which are available in the national capital. Students in Canadian and colonial history are encouraged, for instance, to make use of the wealth of material found in the Public Archives of Canada and other agencies of the federal government. The advantages of Ottawa as a research centre are especially apparent in graduate studies in Canadian history, and in Commonwealth and international relations.

PASS COURSE

Students majoring in History in the Pass Course are required to complete at least seven courses in History. One of these courses must be History 220, taken in the First year. The remaining courses in History, as well as those selected in other subjects, must be chosen in consultation with a member of the Department.

Students who wish to major (or to take honours) in History will be expected to fulfill the summer reading requirements.

HONOURS COURSE

(For information regarding preparation for admission to the Ontario College of Education for the Interim High School Assistant's certificate, Type A, students are invited to consult the Registrar.)

History. The First year of the honours program in social sciences, or the First year of the pass Arts course, including History 220 in either case.

Additional courses bringing the total of credits beyond the Qualifying University Year to at least 20, including those of the following which have *not* been taken in the First year:

1. At least 10 courses in History including: History 220, 330, 335, 340, 350, 388; History 320 *or* 322; History 396 (a dissertation) and two others.
2. At least four courses in a minor field (ordinarily in Economics, Geography or Political Science, but may be in English or another subject).
3. History 390, a seminar in historical method, which is a half course taken (ordinarily in the Third year) for no credit.

Candidates will be required to show a proficient reading knowledge of a modern language other than English, preferably French or German.

At the end of the Fourth year each candidate will present a dissertation, involving research into a problem of historical interpretation, in a fashion displaying competence in historical method. The subject for research will be settled in consultation

with the Department, and a supervisor will be assigned. The candidate will be publicly examined upon his dissertation after presentation. This dissertation is listed in the calendar as History 396.

History and Political Science: Students intending to take this course should take History 220 or Political Science 210 (or preferably both) in the First year. The choice of courses in subsequent years will be subject to the approval of the chairmen of the two Departments. The honours requirements include at least seven courses in History and seven courses in Political Science. A dissertation (History 396 or Political Science 390) is optional. The course pattern will be arranged so that the student may transfer either to full honours in History or to full honours in Political Science at the end of the Third year, if he then wishes to specialize more intensively.

History and Economics: Consideration will also be given to applications for joint honours in History and Economics.

GRADUATE STUDIES

The Department offers studies leading to the degree of Master of Arts in areas of history for which adequate documentary materials are available. The general regulations governing graduate studies will be found on pp. 70-72; in addition the following regulations of the Department should be noted.

The final year for the Master's degree in History will be composed of:

1. History 388 (The Philosophy of History)
If this course or its equivalent has been taken for an undergraduate degree, another course will be substituted.
2. History 590 (Historical Method — Graduate Studies)
3. Two fields of directed study: History 530 and 533.
4. History 596 (Thesis — Graduate Studies).

In addition a reading knowledge of a modern language other than English, preferably French or German, will be required.

HISTORY 110. [1]. *Main Directions in Modern History*

This course will provide a survey of the forces which since 1870 have shaped the growth of European civilization. It will conclude with a consideration of the roots of the present world situation.

Day Division: Annually (lectures and discussion three hours a week).

Evening Division: 1961-62 (lectures two hours a week, group discussions monthly).
Professors Farr and Bowen; Mr. Grantham

HISTORY 210. [9]. *An Introduction to Western Civilization*

This course will aim at an explanation of the present Western way of life, with its problems, as the outcome of a process of civilization. It will survey the development of Western civilization since the fall of the Roman Empire.

Day Division: 1961-62 (lectures and discussion three hours a week).

Professor Moir

HISTORY 220. *The Origins of Western Civilization*

This course will discuss the origins of Western civilization, as they are found in the medieval period of European history, 500-1450. Students who elect History as their major or honours subject are required to take this course rather than History 210.

Evening Division: 1961-62 (lectures and discussion three hours a week).

Professor Bowen

HISTORY 300. *Greece in the Ancient World*

(Offered in the Department of Classics as *Classical Civilization* 300. See notation there.)

Evening Division: 1961-62 (lectures two hours a week).

HISTORY 301. *Rome in the Ancient World*

(Offered in the Department of Classics as *Classical Civilization* 301. See notation there.)

Not offered, 1961-62.

HISTORY 310. *History of the Church and Christian Thought*

(Offered jointly with the Department of Religion. See notation as Religion 310.)

Day Division: 1961-62 (lectures and discussion three hours a week).

Professor Bowen

HISTORY 315. *Economic History*

(Offered in the Department of Economics as *Economics* 315. See notation there.)

HISTORY 320.[4]. *History of Europe, 500-1450*

This course will deal with the history of Western Europe and its external relations in the Middle Ages.

Evening Division: 1961-62 (lectures and discussion three hours a week).

Professor Bowen

HISTORY 322.[6]. *History of Europe, 1450-1715*

The primary concern of this course will be to arrive at an accurate appreciation of the Renaissance and the Reformation.

PREREQUISITE: History 220.

Not offered, 1961-62.

HISTORY 326.[14]. *History of Modern Europe, 1715-1919*

This course will be concerned primarily with the French Revolution and its aftermath in the general history of nineteenth-century Europe.

PREREQUISITE: History 220.

Summer, 1961 (lectures and discussion ten hours a week).

Day Division: 1961-62 (lectures and discussion three hours a week).

Professor Mealing, Mrs. Knowles

HISTORY 330.[13]. *Canada from 1791: The Evolution of Canadian Self-Government*

This course will consider the constitutional evolution of Canada from representative to responsible government, and from federation to autonomy. Attention will also be given to the emergence of Canada into the world community.

RECOMMENDED FOR REFERENCE: Kennedy, *The Constitution of Canada* (Oxford).

Brebner, *North Atlantic Triangle* (Ryerson).

Day Division: Annually (lectures three hours a week).

Evening Division: Summer 1961 (lectures five hours a week).

Professor Gibson, Mr. Clark

HISTORY 335.[3]. *History of North America in the Colonial Period*

An introduction to the history of Canada and the United States. The development of the Spanish, English, and French empires in North America will be described.

TEXTS: Nettels, *The Roots of American Civilization* (Appleton-Century-Crofts).

Canadian Historical Association Booklets, Nos. 3-6.

Day Division: 1961-62 (lectures and discussion three hours a week).

Professor Mealing

HISTORY 340. [8]. *History of the United States of America*

This course will consider the history of the United States in the national period, emphasizing political and economic factors.

Day Division: 1961-62 (lectures and discussion three hours a week).

Professor Farr

HISTORY 343. [18]. *Canada-United States Relations*

This course will trace the development of Canadian-American relations from the end of the eighteenth century, with particular attention on the period since 1871.

PREREQUISITE: Permission of the Department.

Not offered, 1961-62.

HISTORY 350. *British Constitutional History*

This course will survey the development of the British constitution from its Anglo-Saxon beginnings, with the emphasis on the period after 1660. Use will be made of documents.

PREREQUISITE: History 220 or permission of the Department.

Not offered, 1961-62.

HISTORY 353. [10]. *English Social History*

This course is intended primarily to provide a background for the study of English literature. It will concentrate upon the non-political history of England.

PREREQUISITE: History 220 or permission of the Department.

Not offered, 1961-62.

HISTORY 356. *Medieval Britain*

This course will examine the development of medieval English institutions from the Anglo-Saxon invasions, with particular reference to political, religious, social and economic organization and to the external relations of England. Attention will also be given to the language and literature of medieval England.

PREREQUISITE: History 220 or permission of the Department.

Not offered, 1961-62.

HISTORY 357. *The Tudors and Stuarts, 1485-1714*

This course will consider the major currents in sixteenth- and seventeenth-century British history, whether social, economic, political, religious, or intellectual.

PREREQUISITE: History 220.

Not offered, 1961-62.

HISTORY 358. *British History from 1714*

The main emphasis of this course will fall on the nineteenth century, the major currents of which it will consider in their effect on Great Britain.

PREREQUISITE: History 220.

Summer, 1961 (lectures and discussion ten hours a week).

Day Division: 1961-62 (lectures and discussion three hours a week).

HISTORY 360. [23]. *The Economic Development of Canada*

This course is designed as an advanced course in the economic history of Canada and will stress the influence of geography and the impact of ideas and institutions from other areas upon North American development. (The course is listed also as *Economics 360*).

RECOMMENDED FOR REFERENCE: Easterbrook and Aitken, *Canadian Economic History* (Macmillan)

PREREQUISITE: Economics 210 or History 330 or 335.

Evening Division: 1961-62 (lectures and discussion two hours a week).

HISTORY 370.[7]. *British Expansion Overseas and the British Empire*

This course will consider the development of the British Empire and Commonwealth from the American Revolution to the present day.

RECOMMENDED FOR REFERENCE: Burt, *The Evolution of the British Empire and Commonwealth from the American Revolution* (Heath).

PREREQUISITE: Permission of the Department.

Not offered, 1961-62.

HISTORY 373.[17]. *The British Commonwealth of Nations*

This course will deal with the philosophy, structure, and development of the Commonwealth association under the Crown.

PREREQUISITE: Permission of the Department.

Not offered, 1961-62.

HISTORY 380.[16]. *An Introduction to the History of International Relations, 1900-1939.*

The central theme of this course will be the attempt to establish a lasting peace after the First World War and the failure of that attempt.

RECOMMENDED FOR REFERENCE: Carr, *International Relations between the Two World Wars, 1919-1939* (Macmillan); Potter, *An Introduction to the Study of International Organization* (Appleton-Century); *Complete World Atlas* (Hammond, New York).

PREREQUISITE: Permission of the Department.

Not offered, 1961-62.

HISTORY 388.[25]. *The Philosophy of History*

This is a seminar in which major historical writings and works in the philosophy of history will be examined in reference to such questions as the nature and importance of historical knowledge and the pattern of universal history.

PREREQUISITE: Permission of the Department.

Not offered, 1961-62.

HISTORY 390.[S1]. *Historical Method — Honours*

This seminar will discuss problems of historical method, including the sources of history, the essentials of historical research, historical criticism, the weighing of evidence, bias in historical recording, and the mechanics and vocabulary of historical writing with special emphasis on the preparation of historical papers.

Day Division: Annually (tutorial hours arranged).

Members of the Department

HISTORY 396.[35]. *Dissertation for Honours in History*

Candidates for honours in History will be required to present, at the end of their Fourth year, a dissertation involving research into a problem of historical interpretation, and in a fashion displaying an adequate competence in historical method. The subject for research will be settled in consultation with the Department and a supervisor will be assigned. The candidate will be publicly examined upon his dissertation after presentation.

Day Division: Annually (tutorial hours arranged).

Members of the Department

HISTORY 530. *British North America, 1783-1867*

A seminar in the history of the British North American colonies from 1783 to 1867. Assignments will be required, together with a written examination.

Evening Division: 1961-62 (lectures and discussion two hours a week).

Professors Mealing and Moir

HISTORY 533. *Canada since 1867*

A seminar in the history of Canada after 1867. Assignments will be required, together with a written examination.

Not offered, 1961-62.

HISTORY 590. *Historical Method — Graduate Studies*

This course will cover the same subjects as History 390, except that it will be directed toward the preparation of a graduate thesis in History.

Day and Evening Divisions: Annually (tutorial hours arranged).

Members of the Department

HISTORY 596. *Thesis — Graduate Studies*

A thesis, involving a substantial historical investigation, will be the principal requirement for the Master's degree in History. The subject will be settled in consultation with the Department and a supervisor will be assigned. The candidate will be publicly examined upon his thesis after presentation.

Day and Evening Divisions: Annually (tutorial hours arranged).

Members of the Department

See also Geography 335, Historical Geography

Political Science 310, *Comparative Parliamentary Systems*

Political Science 315, *The Commonwealth in Asia and Africa*

ITALIAN

ITALIAN 115. *Introduction to Italian*

A beginning course. Grammar, reading, and oral practice.

Not offered, 1961-62.

ITALIAN 220. *Italian Literature*

A brief but inclusive review of Italian literature, with emphasis on reading and study of the important texts. Composition and oral practice.

Not offered, 1961-62.

JOURNALISM

Professor and Director of the Department

Wilfrid Eggleston, M.B.E., B.A., F.A.G.S.
(on leave of absence, 1961-62)

Assistant Professor and Chairman of the Department, 1961-62

W. H. Kesterton, B.A., B.J.

Visiting Lecturer T. J. Scanlon, B.J., D.P.A., M.A.

Sessional Lecturer Frances Oakes Baldwin, B.A., B.J.

Seminar Leaders W. B. Herbert, B.A., LL.B.

Philip Calder, B.A.

Field Work Supervisors Roy LaBerge

Kenneth Flaherty

Note: Journalism subjects may be taken only by candidates for the degree of Bachelor of Journalism.

JOURNALISM 210. *Preparatory Lectures for First-year Journalism Students*

A series of meetings with members of the staff of the Department of Journalism will be arranged for the guidance of students enrolled in the First year of the Journalism course. Details as to dates, themes, and instructors will be supplied to students by mail. First-year Journalism students will be expected to attend these sessions, but the lectures yield no academic credit and no tuition fee is charged for them.

Day Division: Annually (lectures arranged).

Professor Kesterton and Mr. Scanlon

JOURNALISM 310.[1]. *Introduction to Journalism*

A broad survey of the whole field. Discussion of free lance writing, with practical exercises in the magazine article, newspaper feature, dramatic script, and the short story. Marketing. Personal qualifications and opportunities. The main trends in the journalism of Canada from 1752 to the present will be examined, and important publications and representative journalists of the period considered. Some account of the press of other countries also will be given.

RECOMMENDED READING: Bond, *An Introduction to Journalism* (Brett-Macmillan).

Siebert, Peterson and Schramm, *Four Theories of the Press* (University of Illinois Press).

Day Division: Annually (lectures and practical exercises, four hours a week).

Professor Kesterton and Mrs. Baldwin

JOURNALISM 320.[2]. *Fundamentals of Reporting*

The nature of news values; how to recognize and collect news; how to analyse, organize and report it. Interviewing and news gathering. This is mainly a practical course, based on assignments in reporting and other forms of writing.

TEXT: Strunk and White, *The Elements of Style* (Macmillan).

RECOMMENDED READING: Neal, *News Gathering and News Writing* (Prentice-Hall).

Day Division: Annually (lectures and practical exercises, four hours a week; group discussions).

Mr. Scanlon

JOURNALISM 330.[3]. *Editing*

Copy-reading and head-writing. This course will provide practical instruction in the duties and responsibilities of the deskman, and training in reading copy and writing headlines. The responsibilities and opportunities of the editor in his community will be discussed; the press and society; semantics; the ethics of journalism; freedom of the press; the law and the press; censorship in war and peace; news policy; the sources and interpretation of foreign news; layout; the use of illustrations.

TEXT: Bastian, Case, and Baskette, *Editing the Day's News* (Macmillan).

PREREQUISITE: Journalism 310.

Day Division: Annually (lectures three hours a week).

Professor Kesterton

JOURNALISM 340.[4]. *Interpretative Reporting*

Coverage of governmental activities and other specialized fields such as business, music, drama, the film, politics, the popularization of science, the column; the book review. Development of sources and contacts. Writing for the ear in the radio newscast, the radio talk and commentary. This is mainly a practical course based on assignments, and includes field work on a daily newspaper and a radio station. Methods of research; filing; work in newspaper library and morgue.

TEXT: MacDougall, *Interpretative Reporting* (Macmillan).

PREREQUISITE: Journalism 320.

Day Division: Annually (lectures and practical exercises averaging four or five hours a week).

Mr. Scanlon

JOURNALISM 350.[5]. *Career Seminar in Journalism*

Round table discussions with guest speakers. Each student in Journalism 350 will be required to choose a current topic of Canadian interest for extensive live research and study as preparation for an oral report, which will be followed by questioning from instructor and group. Vocational guidance. Groups will be arranged whenever possible to meet the needs of those who have special interests or ambitions.

PREREQUISITE: For final year Journalism students.

Day Division: Annually (round table sessions, two hours a week, plus special seminars).

Members of the Department

MATHEMATICS

Professor, Chairman of the Department, 1961-62

M. S. Macphail, M.A., D.Phil., F.R.S.C.

Associate Professors F. H. Northover, M.A., Ph.D., P. R. Beesack, A.M., Ph.D.

Lecturers R. B. Gamble, B.Sc., Isabel Macquarrie, A.M., H. Treffner, B.Sc.

Sessional Lecturers R. L. Beatty, B.A.;

L. J. Byrne, M.A.; D. K. Dale, B.A.; I. Fellegi, M.Sc., J. C. Gardner, B.A., M.Ed.;

Frances Hobson, M.A.; L. W. Rentner, B.A.; P. Robinson, Ph.D.; Velma Rust,

Ph.D.; A. J. Wickens, M.Sc.; M. Rukiewicz, Civ.Eng.

PASS COURSE

Pass students must take Mathematics 211, 305, 310, and at least two additional full courses (or the equivalent in half courses), chosen with the approval of the Mathematics Department. At least one of the two additional courses must be numbered 300-399.

Students entering First year who plan to take major or honours in Mathematics should obtain the advice of the Department as to their choice of courses.

HONOURS COURSE

(For information regarding preparation for admissions to the Ontario College of Education for the Interim High School Assistants' certificate, Type A, students are invited to consult the Registrar).

Basic requirements: The Qualifying University and First years of the pass arts or science course, including Mathematics 211 and a first course in the minor.

Honours requirements:

1. At least 15 courses beyond First year:

Nine courses in Mathematics, numbered 300 or higher, and including Mathematics 305, 310, 320, 391.

Six other courses, two of which must be from the humanities or social sciences.

2. All courses are chosen subject to the approval of the Department.
3. The candidate must demonstrate a reading knowledge of one of French, German, or Russian.
4. There will be a comprehensive examination at the end of each of the Third and Fourth years.
5. Combined honours in Mathematics and Physics may also be arranged. See *Physics*.

Note: Courses in Applied Mathematics and Statistics will be found listed, beginning on p. 137.

MATHEMATICS 110 [1]. *Algebra*

Ratio, proportion, variation, theory of quadratics solution of equations, the progressions, interest and annuities, the function, permutations and combinations, binomial theorem. (Half course.)*

TEXT: Petrie, Baker, Levitt, and MacLean, *Algebra*

Evening Division: Annually (lectures two hours a week, *both* terms).

Mr. Rentner

MATHEMATICS 111. [1]. *Geometry*

Cartesian co-ordinates. The straight line, circle and conics with some elementary properties. (Half course.)*

TEXT: Durrant and Kingston, *A New Analytic Geometry*

Evening Division: Annually (lectures two hours a week, *both* terms).

Mr. Gardner

MATHEMATICS 112. [1]. *Trigonometry*

Fundamental formulae, solution of triangles, logarithms, applications to problems in statics. (Half course.)*

TEXT: Petrie, Baker, Levitt, and MacLean, *Elements of Trigonometry and Statics*

Evening Division: Annually (lectures two hours a week, *both* terms).

Mr. Rentner

MATHEMATICS 116. [115]. *Introductory College Mathematics*

Rational, real, and complex number systems; sets, relations, and functions; permutations, combinations, and probability; equations and inequalities; polynomial, rational, exponential, and logarithmic functions; trigonometric functions with applications; analytic geometry of two dimensions.

TEXT: Allendoerfer and Oakley, *Fundamentals of Freshman Mathematics*.

Day Division: Annually (lectures four hours a week).

Summer 1961 (lectures five hours a week).

Mr. Gamble and Mr. Treffner

MATHEMATICS 200. *General Mathematics*

Deductive nature of mathematics; the axiomatic method; selected topics such as probability and theory of games with application to social and economic problems. Introduction to calculus and to recent developments in mathematics.

TEXT: Richardson, *Fundamentals of Mathematics*.

REFERENCE: Kemeny, Snell and Thompson, *Finite Mathematics*.

Day Division: Annually (lectures three hours a week).

Mrs. Macquarrie

*Any one of Mathematics 110, 111, 112 carries half-course credit. Full-course credit is given when two or three of these are taken. Students are reminded that all three (or Mathematics 116) are prescribed in the qualifying university year of the B.Sc. and the B.Com. courses, and for entry to the Engineering course. The tuition fee for one of the three is that of a half course; the fee for any two or three, taken in the same year, is that of a full course.

MATHEMATICS 211. *Calculus*

An introductory course in differential and integral calculus, with emphasis on the fundamental processes and applications. Some topics of algebra and geometry are also included, namely, polar coordinates, solution of equations, solid analytic geometry, complex numbers and determinants.

TEXT: Britton, *Calculus*.

PREREQUISITE: Mathematics 110, 111, 112 (permission may be granted to enter with two of these) or Mathematics 116.

Day Division: Annually (lectures four hours a week).

Evening Division: Annually (lectures four hours a week). Summer 1961 (lectures five hours a week).

Prof. Northover, Mr. Gamble, Mr. Treffner, and Mrs. Rust

MATHEMATICS 220. [3a]. *Mathematics of Investment*

Simple and compound interest; annuities; funding of debts; bonds; depreciation; elementary life contingencies. (Half course).

TEXT: Hart, *Mathematics of Investment*.

PREREQUISITE: Mathematics 110, 111, or Mathematics 116.

Day Division: Not offered, 1961-62.

Evening Division: 1961-62 (lectures three hours a week, first term).

MATHEMATICS 247. *Analytic Geometry, Spherical Trigonometry, and Algebra*

Conic sections, transformation of coordinates, solid analytic geometry. Spherical trigonometry. Solution of equations.

TEXTS: Rider, *Analytic Geometry*.

Griffin, *Spherical Trigonometry*

Rosenbach and Whitman, *College Algebra*.

Day Division: Annually, for first year Engineering students only (lectures three hours a week, first term).

Mr. Gamble

MATHEMATICS 305. *Algebra and Geometry*

Theory of equations; matrices and determinants; linear equations; discriminant and resultant, quadrics and rulings; principal axis transformation in two and three dimensions; invariants.

TEXTS: To be announced.

PREREQUISITE: Mathematics 211.

Day Division: 1961-62 (lectures three hours a week).

Summer, 1961 (lectures five hours a week in evening division).

Mr. Treffner

MATHEMATICS 310. [8]. *Calculus and Differential Equations*

Technique of integration, multiple integrals, partial differentiation, Taylor's theorem, indeterminate forms, curvature. Ordinary differential equations, with applications.

TEXTS: Britton, *Calculus*

Martin and Reissner, *Elementary differential equations*.

PREREQUISITE: Mathematics 211.

Day Division: Annually (lectures three hours a week).

Evening Division: 1961-62 (lectures three hours a week).

Professor Macphail and Professor Beesack

MATHEMATICS 315. *Modern Algebra I*

An introduction to concepts of modern algebra; integral domain, field, group, vector space, linear transformation.

TEXT: Johnson, *First course in abstract algebra*.

PREREQUISITE: Mathematics 305.

Day Division: 1961-62 (lectures three hours a week).

Evening Division: Summer, 1961 (lectures five hours a week).

Mrs. Macquarrie

MATHEMATICS 317. *Modern Geometry*

Foundations of Euclidean geometry; projective and non-Euclidean geometries.

TEXT: To be announced.

PREREQUISITE: Mathematics 305.

Day Division: 1961-62 (lectures three hours a week).

Mrs. Macquarrie

MATHEMATICS 320. *Introduction to Analysis: Advanced Calculus*

Elementary theory of real numbers. Concept of a function: functions of a real variable, sequences. Concept of a limit. Functions of a single real variable: continuity and differentiability. Functions of several real variables: partial derivatives, the implicit function theorem and Jacobians. Riemann integral, multiple integrals, line and surface integrals, the convergence of infinite series and integrals; uniform convergence.

TEXT: R. C. Buck, *Advanced calculus*.

REFERENCE: G. H. Hardy, *Pure Mathematics*.

PREREQUISITES: Mathematics 305 or 247, and 310.

Day Division: 1961-62 (lectures three hours a week).

Professor Beesack

MATHEMATICS 330.[10]. *Modern Algebra II*

Groups, rings, fields. Galois theory.

TEXT: Van der Waerden, *Modern Algebra*.

PREREQUISITE: Mathematics 260.

Evening Division: 1961-62 (lectures three hours a week).

Mr. Fellegi

MATHEMATICS 340. *Introduction to Mathematical Logic*

Propositional calculus and predicate calculus; structures; Boolean algebra, representation theorem; axiom of choice.

TEXTS: To be announced.

Not offered, 1961-62.

MATHEMATICS 365.[12a]. *Functions of a Complex Variable*

General properties of analytic functions. (Half course.)

TEXT: Copson, *Theory of Functions of a Complex Variable*.

PREREQUISITE: Mathematics 320.

Day or Evening Division: Tutorial hours arranged.

Mr. Fellegi

MATHEMATICS 370.[12b]. *Special Functions*

Continuation of Mathematics 365. (Half course.)

TEXT: Copson, *Theory of Functions of a Complex Variable*.

PREREQUISITE: Mathematics 365.

Not offered, 1961-62.

MATHEMATICS 371. *Functions of a Real Variable*

Lebesgue measure; Lebesgue and Lebesgue-Stieltjes integrals for functions of one or two variables. (Half course.)

TEXT: To be announced.

PREREQUISITE: Mathematics 320.

Not offered, 1961-62.

MATHEMATICS 375. *Differential Equations*

Advanced theory of ordinary and partial differential equations.

TEXTS: Burkill, *Theory of Ordinary Differential Equations*.
Sneddon, *Elements of Partial Differential Equations*.

PREREQUISITES: Mathematics 320, 326.

Not offered, 1961-62.

MATHEMATICS 380. [18a]. *Differential Geometry*

Theory of curves and surfaces. (Half course.)

TEXT: Struik, *Introduction to Classical Differential Geometry*.

REFERENCES: W. Blaschke, *Differentialgeometrie I*.
C. E. Weatherburn, *Differential Geometry*.

PREREQUISITE: Permission of the Department.

Day or Evening Division: Tutorial hours arranged.

Professor Northover

MATHEMATICS 381. *Tensor Calculus*

A development of tensor calculus with application to the study of Riemannian spaces. (Half course.)

TEXT: To be announced.

REFERENCE: Weatherburn, *Riemannian Geometry and the Tensor Calculus*.
Not offered, 1961-62.

MATHEMATICS 391. *Problems and Readings*

Honours students work a number of advanced problems drawn from various sources. Readings are also assigned, and an examination is set, covering the whole course.

PREREQUISITE: Open only to honours Mathematics students.

Day or Evening Division: Tutorial hours arranged.

Members of the Department

MATHEMATICS 395. *Directed Special Studies*

Honours students may be required to present a report or thesis on parts of mathematics not included in the courses listed above. (Half course.)

PREREQUISITE: Open only to honours Mathematics students.

Day or Evening Division: Tutorial hours arranged.

Members of the Department

GRADUATE STUDIES

The Mathematics Department is prepared to direct graduate students in certain branches of the following: Algebra, Applied Mathematics, Analysis, and Statistics.

A selection from the following courses will be offered if there is sufficient demand:

MATHEMATICS 520. *Real Variables, Fourier Series, Functional Analysis*

Professor Macphail

MATHEMATICS 540. *Modern Algebra*

One of the following subjects will be treated; theory of groups, theory of rings, algebraic number theory, elementary algebraic geometry.

MATHEMATICS 550. *Mathematical Logic*

Completeness theorem of the predicate calculus; predicate calculus with equality; application to Algebra; decision problem, complete theories. Some recent research papers will be studied.

MATHEMATICS 560. *General Topology*

TEXT: J. L. Kelley, *General Topology*.

MATHEMATICS 570. *Functional Analysis II*

Continuation of Mathematics 520.

MATHEMATICS 580. *Integral Equations and Transforms*

APPLIED MATHEMATICS AND STATISTICS

MATHEMATICS 230.[3b]. *Elementary Mathematical Statistics—Part I*

Frequency distributions; measures of central tendency, dispersion, skewness, kurtosis; moments; elementary probability; probability distributions—binomial, normal, Poisson. (Half course) (See also Economics 320, *Statistical Methods in the Social Sciences*).

TEXT: Dixon and Massey, *Introduction to Statistical Analysis*.

PREREQUISITE: Mathematics 110, 111, or Mathematics 116.

Evening Division: Annually (lectures three hours a week, *first term*).

Mr. Dale

MATHEMATICS 235.[3c]. *Elementary Mathematical Statistics—Part II*

Sampling; statistical inference; tests of hypotheses—mean variance; use of the “t”, “F”, and “chi-squared” distributions; confidence limits—mean, variance; introduction to analysis of variance, including randomized block design; enumeration statistics; least squares, simple regression and correlation. (Half course).

PREREQUISITE: Mathematics 230.

Evening Division: Annually (lectures three hours a week, *second term*).

Mr. Dale

MATHEMATICS 236. *Applied Statistics*.

Random sampling from finite and infinite populations; applications of hypergeometric, binomial, Poisson, normal and chi-squared distributions; types of error; operating characteristics; sampling inspection; single, double and sequential sampling plans; quality control and control charts; tolerance limits; sensitivity experiments. Applications will be mainly in industry, manufacturing, and engineering. (Half course.)

Not offered, 1961-62.

MATHEMATICS 237. *Sampling Survey Methods*

Theory of sampling from finite populations; sample design, random, stratified, etc.; area, quota, purposive, systematic and multi-stage sampling; principles of optimum allocation: relative efficiencies of different methods. (Half course).

Evening Division: 1961-62 (lectures three hours a week, *second term*).

Mr. Fellegi

MATHEMATICS 238. *Introduction to Experimental Design*

The principles of experimentation, randomization, replication, null hypothesis. Randomized blocks, Latin squares, factorial experiments including fractional replication and confounding. The use of supplementary observation to reduce error. (Half course.)

SUGGESTED TEXT: *The Planning of Experiments* by D. R. Cox, published by John Wiley and Sons.

Evening Division: 1961-62 (lectures three hours a week, *first term*).

Mr. Robinson

MATHEMATICS 300. *Applied Mathematics*

An introductory course in Applied Mathematics — its methods and techniques.

TEXT: To be announced.

PREREQUISITE: Mathematics 211. Registrants for this course will find it useful if their overall program permits, to take Physics 205, previously or concurrently, as this will provide valuable insight, through experimental facilities, of practical situations in which mathematical techniques can be applied.

Day Division: Annually (lectures three hours a week).

Mrs. Northover

MATHEMATICS 326. *Mathematical Methods*

Series solution of ordinary differential equations; Gamma, Bessel, and Legendre functions; solution of partial differential equations; Fourier series and integrals; Laplace transforms; vector analysis; complex variable theory.

TEXTS: Kells, *Elementary Differential Equations*.

Reddick and Miller, *Advanced Mathematics for Engineers*.

REFERENCE: Woods, *Advanced Calculus*.

PREREQUISITE: Mathematics 310.

Day Division: Annually (lectures three hours a week).

Professor Northover

MATHEMATICS 335.[13]. *Intermediate Statistical Analysis*

Linear and curvilinear regression; frequency distributions in two variables; multiple and partial correlation; other measures of correlation; index numbers; time series. Analysis of variance and covariance; design of experiments; Latin squares and split plot designs; qualitative statistics; non-parametric methods.

TEXT: To be announced.

PREREQUISITE: Mathematics 230, 235.

Not offered, 1961-62.

MATHEMATICS 350. *Numerical Methods*

Finite differences, with applications to interpolation, numerical integration, differentiation, and solution of differential equation. Methods of matrix elimination and inversion, with applications to least squares and regression. Introduction to computer programming. (Half course.)

PREREQUISITE: Mathematics 211. Knowledge of the elements of differential equations and matrix algebra is also desirable.

TEXT: To be announced.

Evening Division: 1961-62 (lectures three hours a week, *second term*).

Mr. Wickens

MATHEMATICS 351. *Numerical Methods II*

Continuation of Mathematics 350.

Not offered, 1961-62.

MATHEMATICS 355.[20a and 20b]. *Probability and Statistical Inference*

Logical foundations and axiomatic treatment of probability. Distribution functions in one or more dimensions. Stieltjes integrals. Moments. Binomial, normal, Poisson, chi-squared, t, F distributions. Generating and characteristic functions. Limit theorems. Stochastic convergence and the law of large numbers. Fundamentals in estimation and testing hypotheses. Criteria of consistent, efficient and sufficient estimates. The method of maximum likelihood. The power of a test. Illustrations from physical, biological and social sciences.

TEXT: Mood, *Introduction to the Theory of Statistics*

PREREQUISITE: Mathematics 310.

Evening Division: 1962-63 and alternate years (lectures three hours a week).

GRADUATE COURSES (APPLIED)

MATHEMATICS 510. *Advanced Probability and Statistics*

(Texts by Feller and Cramer).

MATHEMATICS 530. *Advanced Statics and Analytical Dynamics*

General systems of forces and Poinso't's reduction to a single force and a wrench. Selected topics in Statics including theory of attractions. Dynamics of a Particle and of Rigid Bodies including rotating frames of reference and the influence of the rotating earth. Constrained motion: motion of a particle on curves and surfaces. Kinetic energy, linear momentum and angular momentum of a rigid body: general equations of motion: motion under no forces. Tops and gyroscopes. Lagrange's equations for holonomic systems: extension to non-holonomic systems: theory of small vibrations. Variational methods. Least action and Hamilton's principle.

PREREQUISITE: Mathematics 300 and 326.

TEXTS: Ramsey: *Dynamics II*.
Ramsey: *Statics*.

Professor Northover

MATHEMATICS 531. *Hydrodynamics and Wave Motion*

The fundamental theory of fluid motion, including irrotational motion in two and three dimensions, vortices, discontinuous flow, Blasius' theorem, elementary aerofoil theory, wave motion, viscous flow.

PREREQUISITE: Mathematics 326 or the equivalent.

TEXT: Ramsey: *Treatise on Hydromechanics, Part II*.

Professor Northover

MATHEMATICS 532. *Electromagnetic theory and Magneto-hydrodynamics*

Electromagnetic theory leading up to Maxwell's equations. Cartesian Tensors. The space-time continuum: the tensor formulation of Maxwell's equations and the Lorentz transformation. Propagation of electromagnetic waves through isotropic and anisotropic media. Propagation through ionised gases and the magneto-ionic theory: critical (plasma) frequency: Martyn's theorem. An introduction to Magneto-hydrodynamics. Boundary value problems, Green's functions, and diffraction theory.

PREREQUISITE: Mathematics 326 or the equivalent.

TEXT: Abraham and Becker: *Classical Electricity and Magnetism*.

REFERENCES: Stratton: *Electromagnetic theory*.
Cowling: *Magneto-hydrodynamics*.

Professor Northover

MATHEMATICS 539. *Advanced Problems and Readings*

In this course time will be devoted to the study of the special functions and methods often needed for the solution of problems at the research level. Research papers will also be studied. The intention is to give the student insight into the sort of attack needed for problems at this level.

Professor Northover

PHILOSOPHY

<i>Professor; Chairman of the Department, 1961-62</i>	J. C. S. Wernham, M.A., S.T.M.
<i>Associate Professor</i>	Bernard Wand, M.A., Ph.D. (on leave of absence, 1961-62)
<i>Assistant Professors</i>	James M. Thompson, M.A., R. S. Talmage, M.A.
<i>Lecturer</i>	Andrew Jeffrey, M.A.

Majors in Philosophy will take a minimum of five courses in Philosophy. Special arrangements will be made for students proposing a combined major program. All majors will arrange their programs in consultation with the department.

HONOURS COURSES

The honours program may be entered at the beginning of the First year, or by transfer from the pass course if second class standing has been attained. Philosophy 215 should be taken in the First year.

The honours program will consist of a minimum of eight courses in Philosophy, plus an honours thesis which will count as one course. The student's program for the Second year and subsequent years will be planned in consultation with the chairman of the Department. The following courses will be required: 215; 310; 320; 330; 340; 370; 380.

Combined honours. Students who are interested in pursuing an honours program in which Philosophy is combined with another subject are invited to discuss the matter with the chairman of the department of Philosophy. The minimum requirement in Philosophy in this type of program will be six courses plus the honours thesis which will count as one course. The following courses will be required: 215; 310; 320; either 340 or 360; either 370 or 380.

PHILOSOPHY 215. *Introduction to Philosophy*

An introduction to the various areas of Philosophy. The course will consist of lectures on logic, language, and scientific method; and on selected topics in ethics and theory of knowledge.

Day Division: Annually (lectures three hours a week, discussion one hour a week).

Evening Division: 1961-62 (lectures two hours a week, discussion two hours fortnightly).

Members of the Department

PHILOSOPHY 310. [3, 310, 220]. *Greek Philosophy*

An account of the early history of philosophical speculation in the Greek world, of the role of the Sophists and of Socrates; together with a study of selected writings of Plato and Aristotle.

PREREQUISITE: Philosophy 210 or 220 or permission of the Department.

Day Division: Annually (lectures and discussion three hours a week).

Mr. Jeffrey

PHILOSOPHY 320. [4]. *Modern Philosophy: 1600-1800.*

An examination of the major philosophical writers of the seventeenth and eighteenth centuries. Selections will be studied from the works of Descartes, Spinoza, Leibnitz; Locke, Berkeley, Hume; and Kant.

PREREQUISITE: Philosophy 210 or 220; or permission of the Department.

Day Division: Annually (lectures and discussion three hours a week).

Professor Wernham

PHILOSOPHY 330. [5]. *Modern Philosophy: 1800—.*

An examination of the major philosophical writers of the nineteenth and twentieth centuries: German idealism from Kant to Hegel; the anti-Hegelian philosophies of Marx, Kierkegaard, Schopenhauer and Nietzsche; evolution and the philosophy of Bergson; American pragmatism (James, Peirce, Dewey); Whitehead; a brief sketch of recent philosophy.

PREREQUISITE: Philosophy 210 or 220; or permission of the Department.

Day Division: Annually (lectures and discussion three hours a week).

Professor Thompson

PHILOSOPHY 340. *Ethics*

A historical and critical analysis of the chief concepts used to explain and justify moral thinking and conduct. The theoretical accounts of the concepts of 'right', 'duty' and 'good', as they are found in the writings of modern and contemporary philosophers, are considered.

An analysis of the nature of egoism, sympathy, and altruism is given in an attempt to determine the possibility of disinterested actions. Finally, the relationship between morality and certain political, religious, and scientific beliefs is examined.

PREREQUISITE: Philosophy 210 or 220; or permission of the Department.

Day Division: Annually (lectures and discussion three hours a week).

Mr. Jeffrey

PHILOSOPHY 350. [7]. *Philosophy and Religion*

An investigation, both historical and systematic, into the relations between faith and reason; together with an examination of the question of the existence and nature of God. Texts to be studied will be representative of mediaeval Scholasticism, German Idealism, Existentialism, and Philosophical Analysis.

PREREQUISITE: Permission of the Department.

Day Division: Annually (seminar two hours a week).

Professor Wernham

PHILOSOPHY 360. *Social and Political Philosophy*

An examination of the concepts of society, state, natural law, inalienable rights and social justice; and a consideration of the moral basis of political obligation. Emphasis will be on analysis rather than on historical origins.

PREREQUISITE: Philosophy 210 or 220; and permission of the Department.

Not offered, 1961-62.

PHILOSOPHY 370. *Logic and Scientific Method*

An investigation of the principles of deductive inference will first be undertaken through a study of the logic of truth functions and of quantificational logic. This will be followed by an examination of the nature and methods of the empirical sciences. In particular, an attempt will be made to determine what principles of non-deductive inference are employed in scientific thinking; and the concepts of law and probability, and the nature of scientific explanation, will be carefully considered.

PREREQUISITE: Philosophy 210 or 220; or permission of the Department.

Day Division: Annually (lectures and discussion three hours a week).

Professor Talmage

PHILOSOPHY 380. *Philosophical Analysis*

A brief account of the history of the movement will be followed by careful study of representative samples of analytic philosophy. Thereafter, analytic techniques will be applied to problems of the philosophy of mind and psychology, and an attempt will be made to determine the scope and usefulness of these techniques.

PREREQUISITE: Philosophy 210 or 220; or permission of the Department.

Day Division: Annually (lectures and discussion three hours a week).

Professor Talmage

PHILOSOPHY 385. *Philosophy Honours Thesis*

Members of the Department

PHILOSOPHY 388. *The Philosophy of History*

See course description and details under History 388.

PHILOSOPHY 390. *Aesthetics*

Analysis of problems in the description, interpretation and evaluation of works of art, including music, literature and the visual arts; together with the study of types of aesthetic theory.

PREREQUISITE: Philosophy 210 or 220; or permission of the Department.

Day Division: Annually (lectures and discussion three hours a week).

Professor Thompson

PHYSICS

<i>Professor, Chairman of the Department, 1961-62</i>	John Hart, B.Sc., Ph.D., A.Inst.P.
<i>Professor</i>	A. M. Munn, M.Sc., Ph.D., F.R.S.A.
<i>Associate Professor</i>	G. R. Love, M.A., Ph.D.
<i>Assistant Professors</i>	A. C. Ghosh, M.Sc.
	T. J. S. Cole, B.Sc. (Eng.), B.Sc., Ph.D., A.C.G.I., M. K. Sundaresan, M.Sc., Ph.D.
<i>Sessional Lecturers</i>	G. Fischer, Dipl.Phys., Dr. ès Sc., M. Romanowski, M.A.
	T. Y. Wu, B.Sc., A.M., Ph.D., F.R.S.C., A. M. Guénault, B.A., Ph.D.
<i>Senior Demonstrator</i>	E. Butterill, B.A.
<i>Demonstrators</i>	R. Ruedy, Ph.D., B. Gaizauskas, M.A.
<i>Laboratory Steward</i>	K. Hafner
<i>Teaching Fellows</i>	P. Kelly, M. O. Poirier

Students taking a single course in physics should take Physics 200. Students taking more than one course in physics should take Physics 205. A minor in physics consists of Physics 205, 304 and 305. Qualifying University year students may be admitted to Physics 200.

PASS COURSE

The first year is that of the pass Science course including Physics 205. In the second year the student takes Physics 304 and 305, Mathematics 310 and three other courses chosen in consultation with the Department. In the third year the following courses are taken: Physics 310 or 315, 325, 330, 340, and 345, Mathematics 326, one humanity. General prerequisites are stated at the end of this section. Pass students are not admitted to courses numbered higher than 399.

OTHER STUDENTS

Students taking a single course numbered higher than 305 are required to take Physics 341 concurrently. Students taking more than one course are required to take Physics 340 concurrently. General prerequisites are stated at the end of this section. Students not taking honours in physics are not admitted to courses numbered higher than 399.

HONOURS COURSE

The first and second years are those of the Physics Honours Course. In the third year the following courses are taken: Physics 310, 315, 420, 325, 330, 340 and 345, Mathematics 326, one humanity or social science. In the fourth year the following courses are taken: Physics 410, 418, 425, 430, 435, 450, 460 or 461, one mathematics course and one humanity. General prerequisites are stated at the end of this section.

At the end of the fourth year comprehensive examinations are given in physics and related mathematics, and the student must submit a thesis on his work carried out in Physics 460 or 461.

Candidates who wish to take a B.Sc. degree with combined honours in Mathematics and Physics should normally take eighteen courses beyond First year, composed of seven courses in Mathematics, seven courses in Physics, two non-science, non-mathematics courses and two other courses chosen in consultation with the Mathematics and Physics Departments.

BACHELOR OF SCIENCE WITH HONOURS IN APPLIED PHYSICS

Admission Requirements: Admission is open only to students who have completed the first two years of the regular engineering course and Physics 304 with a minimum standing of high second class honours.

Length of Course: Subsequent to the two years in engineering, candidates will take a minimum of ten courses spread over two years, making a total of four years from Senior Matriculation.

Course Selection: Courses will be selected in consultation with the chairman of the Physics Department. General prerequisites are stated at the end of this section.

GRADUATE STUDIES

Graduate students will be accepted, at the discretion of the Department, for full-time work in the physics research laboratories under the supervision of members of the Department. A Master's degree may be obtained on a part-time basis. Some assistantships are available. Full regulations for graduate study are available separately. Courses numbered higher than 499 are restricted to formally admitted graduate students.

Language: Candidates for Physics degrees must show a reading knowledge of French, German or Russian. An examination to satisfy this requirement may be written during any regularly scheduled examination period only.

PHYSICS 200. *Concepts and Methods in Physical Science*

This course is planned to give some comprehensive world picture of the physical sciences as they have developed in the past four centuries and as they exist today. Enough detail will be presented to explicate the inductive method of theory formation, but other than this an encyclopedic attention to detail will be avoided. The emphasis will be upon the logical structure.

TEXT: Holton and Roller, *Foundations of Modern Physical Science*.

Day Division: Annually (two one-hour lecture demonstration periods and one three-hour laboratory seminar per week).

Evening Division: Not offered, 1961-62.

Professor Munn

PHYSICS 205. *Introductory Physics*

This elementary and basic course of limited scope, with attention to detail is designed for students who will graduate in physics or engineering. Students who intend to follow other scientific disciplines may also register. The lectures begin with an exhaustive study of simple Newtonian mechanics, including elementary rotational and wave dynamics using the methods of calculus as necessary. A study of the motion of charged particles introduces the topics of electricity and magnetism. Light and sound are introduced as special applications of wave theory; the study of simple harmonic motion earlier in the course is used to illustrate some limited aspects of alternating current circuit theory. The fundamentals of field theory with particular reference to gravitational and electrical effects are discussed, and the classical Bohr atom is mentioned.

TEXTS: Margenau, Watson and Montgomery, *Physics Principles and Applications*.

Rusk, *Introduction to Atomic and Nuclear Physics*.

Avery and Ingram, *Laboratory Physics*.

Chapman, *How to Study Physics*.

Laboratory Instructions, Lecture Notes and Problems for Physics 205.

PREREQUISITES: Mathematics 211 (may be taken concurrently).

Day Division: Annually (lectures three hours per week, laboratory three hours per week, problems one hour per week).

Professor Hart

PHYSICS 304. *Advanced General Physics*

This course extends the work begun in Physics 205 to more difficult topics in the field of classical dynamics, using vector notation. The classical macroscopic mechanical properties of gases, liquids and solids are summarized. There is some discussion of the elements of thermodynamics and a more detailed discussion of the kinetic theory than was given in Physics 205. Longitudinal waves are examined and elastic waves are discussed briefly. In the field of optics, considerable emphasis is placed on diffraction and interference, and there is a full introductory discussion of continuous and discrete spectra. The laboratory work is planned to teach the student techniques in accurate physical measurement.

TEXTS: Sears, F. W., *Mechanics, Wave Motion, and Heat* (Addison Wesley)
Sears, F. W., *Optics*

PREREQUISITE: Physics 205; Mathematics 211; Mathematics 310 (may be taken concurrently).

Day Division: Annually (lectures three hours per week, laboratory three hours per week).

Professor Cole

PHYSICS 305. *Introductory Electricity and Magnetism*

The electrical field theory, introduced in Physics 205, is extended to cover in some detail theorems in electromagnetism, including electromagnetic induction. Elementary D.C. and A.C. circuit theory up to transfer impedance is presented in detail. The principles of complex numbers and complex circuit theory are discussed briefly. The photo-electric effect and Bohr atom are examined in a little more detail than in Physics 205 and the course closes with a brief excursion into circuits involving vacuum tubes. The laboratory consists of straightforward electrical measurements.

TEXT: Shortley and Williams, *Physics, Vol. II*

REFERENCE: Winch, *Electricity and Magnetism*

PREREQUISITES: Physics 205, Mathematics 211, Mathematics 310 concurrently.

Day Division: Annually (lectures three hours per week, laboratory three hours per week).

Professor Love

PHYSICS 310. *Thermodynamics*

The method of thermodynamics and the first and second laws are discussed exhaustively. Applications of the laws are discussed in fair detail. The micro-theory of conduction and specific heats and the formulas and application of the diffusion equation are also discussed.

TEXT: Zemansky, *Heat and Thermodynamics*

Day Division: Annually (lectures two hours per week).

PHYSICS 315. *Optics*

An advanced and detailed study is made of diffraction and interference phenomena; polarization is also discussed. There is an introduction to electron optics. At the end of the course there is a brief summary of the mechanism of the reflection and refraction of electro-magnetic waves at all frequencies.

TEXT: Valasek, *Introduction to Theoretical and Experimental Optics*

PREREQUISITE: Mathematics 310.

Day Division: Annually (lectures two hours per week).

PHYSICS 325. *Electromagnetism* (Half Course)

Professor Ghosh

Classical electromagnetism is studied in detail, using the method of vector calculus. Current electricity is taken up to the concept of transfer impedances of large meshes. There is a summary of the properties of dielectrics and magnetic materials.

TEXT: Harnwell, *Principles of Electricity and Electromagnetism*

PREREQUISITE: Mathematics 310.

Day Division: Annually second term (lectures three hours per week).

PHYSICS 330. *Atomic Physics* (Half Course)

Professor Cole

The course starts with a detailed examination of the theoretical interpretation of results from spectroscopy, including the micro-wave, visible and X-ray regions and the Zeeman and Stark effects. Crystal structure and X-ray diffraction are discussed in (somewhat) less detail. Mention is made of electron diffraction and of the Compton effect. The course is completed with a discussion of some of the principles of quantum mechanics, including the correspondence principle.

TEXT: Peaslee, *Elements of Atomic Physics*

PREREQUISITE: Mathematics 310.

Day Division: Annually first term (lectures three hours per week).

Professor Ghosh

PHYSICS 340. *Third Year Laboratory*. Six hours per week.
Members of the Department

PHYSICS 341. *Selected experiments* from Physics 340. Three hours per week.
Members of the Department

PHYSICS 345. *Laboratory Technique*
During this course the student learns basic technical operations used in the design and construction of research apparatus.
Day Division: Three hours workshop per week.

Mr. Hafner

PHYSICS 410. *Quantum and Statistical Mechanics* (Half Course)
The course starts where 310 left off, with a discussion of the relationship of thermodynamics to statistical mechanics. Subjects discussed include classical statistics, Fermi-Dirac and Bose-Einstein statistics, and the Boltzmann equation. There is also a brief excursion into low-temperature physics.
TEXT: Zemansky, *Heat and Thermodynamics*
REFERENCE: Hill, *Statistical Mechanics*.
PREREQUISITES: Physics 310 (or Engineering 340).
Day Division: Annually, first term (lectures three hours per week).

PHYSICS 418. *Electron Physics* (Half Course)
The course starts with a detailed discussion of the electrical properties of solids, liquids and gases. Contact potentials and work functions are studied. The fundamental physics of vacuum tubes is discussed briefly. The theory of operation of solid-state devices is developed from physical models, and the Hall effect in such devices is dealt with. Developments in thermo-electricity are mentioned.
TEXT: van der Ziel, *Solid State Physical Electronics*
PREREQUISITE: Physics 410.
Day Division: Annually second term (lectures three hours per week).
Professor Hart

PHYSICS 420.[320]. *Vector Mechanics*
Classical dynamics is dealt with in detail in one, two and three dimensions. Small oscillations, coupled systems, normal co-ordinates, , Lagrange's and Hamilton's methods applied to particles, and tops and gyros are discussed. Fourier analysis as applied to physical problems is examined in detail. There is an elementary discussion of some of the principles of fluid dynamics.
TEXT: Becker, *Introduction to Theoretical Mechanics*
PREREQUISITE: Mathematics 310.
Day Division: Not offered, 1961-62.
Students may substitute Mathematics 530 for full credit.

PHYSICS 425. *Electromagnetic Radiation* (Half Course)
The implications of Mawell's equations are discussed in detail and there is a further brief account of reflection, defraction and dispersion at all frequencies. Applications of theory to such things as waveguides are studied, and particle accelerators are described briefly.
TEXT: Harnwell, *Principles of Electricity and Electromagnetism*
PREREQUISITE: Physics 325.
Day Division: Annually first term (lectures three hours per week).

Professor Cole

PHYSICS 430. *Nuclear Physics* (Half Course)
The study of atomic physics started in 330 is continued; the course starts with a review of basic nuclear facts and concepts. Nucleon-nucleon scattering, alpha emission, beta decay, gamma radiation and internal conversion are discussed. The interaction of charged particles and radiation with matter are described. There is a short description of nuclear models and nuclear reactions; nuclear magnetic resonance is discussed; the courses are rounded off with a brief survey of cosmic ray particles.
TEXT: Halliday, *Introductory Nuclear Physics*
PREREQUISITE: Physics 330.
Day Division: Annually second term (lectures three hours per week).
Professor Ghosh

PHYSICS 435. [335]. *Theoretical Physics*

This course constitutes an introduction to the theories of quantum mechanics and special and general relativity. In quantum mechanics, the Schroedinger wave theory, the Heisenberg matrix theory and the Dirac symbolic theory are discussed and applied to problems in one and three dimensions. The Dirac theory of the electron is examined. In special relativity theory the mechanics of mass points, of continuous matter, and of electrodynamics is discussed. In general relativity the field equations are derived and solved for the Schwarzschild field.

TEXTS: *Rojansky, Introductory Quantum Mechanics*

Bergmann, Introduction to the Theory of Relativity

Day Division: Annually (one three-hour seminar per week).

Professor Munn

PHYSICS 450. *Fourth Year Laboratory*. Three hours per week.

The individual laboratory experiments are supervised by members of the department. Students have some choice of experiment, among the apparatus available, and are normally expected to perform one experiment each one or two weeks.

Members of the Department

PHYSICS 460. [360]. *Laboratory Project*PHYSICS 461. *Theoretical Project*

Members of the Department

This is an advanced project course with an orientation towards research; the presentation of a thesis is required.

Day Division: Annually, a minimum of six hours per week.

Members of the Department

PHYSICS 501. *The Structure of Matter*

A post-graduate tutorial course in which theories of the fundamental physical properties of matter and their relationship with experimental observations are discussed.

TEXT: *Dekker, Solid State Physics*.

Day Division: 1961-62 (by arrangement).

Professor Hart

PHYSICS 502. *Selected Topics in Physics*

During a full course of post-graduate study a student may, with the permission of the Department, take more than one selected topic. In that case each full course in Physics 502 will be counted for credit. Not more than one selected topic may be counted for credit in any one academic year.

Day Division: 1961-62 (by arrangement).

Members of the Department

PHYSICS 503. *Graduate experimental research leading to a Master's degree*

Members of the Department

PHYSICS 504. *Graduate experimental research leading to a Doctor's degree*

Members of the Department

PHYSICS 505. *Advanced Quantum Mechanics*

A post-graduate tutorial course which extends the work covered in Physics 435 to a detailed study of a few particular topics.

TEXT: To be announced.

PREREQUISITE: Physics 435.

Day Division: 1961-62 (one two-hour seminar per week).

PHYSICS 506. *Solid State Physics*

The work in Physics 501 is extended to a study of modern theories of the structure of solids, particularly dielectrics and semi-conductors.

TEXT: *Dekker, Solid State Physics*

PREREQUISITE: Physics 501.

Day Division: 1961-62 (one two-hour seminar per week).

Dr. Fischer

PHYSICS 507. *An Introduction to Precision Physical Measurements*

The theory of the treatment of high precision experimental observations is considered in detail. The theoretical results are illustrated by particular measurements of this type especially in the field of electricity and magnetism.

TEXT: To be announced.

Day Division: 1961-62 (one two-hour seminar per week).

Mr. Romanowski

PHYSICS 508. *Precision Physical Measurements*

A survey course of the experimental methods used in making standardization measurements with the highest precision in many fields of applied physics.

TEXT: To be announced.

PREREQUISITE: Physics 507.

Day Division: First offered 1962-63.

PHYSICS 509. *Statistical Mechanics*

The aim of this course is to give post-graduate students who are working in the dielectric field an understanding of the fundamental principles of statistical mechanics. The emphasis is on general theory rather than on particular applications.

TEXT: Hill, *Statistical Mechanics*

Day Division: 1961-62 (one two-hour seminar per week).

PREREQUISITE: Students are not permitted to register in courses higher in number than 305 unless they have obtained a B average in Physics 205, 304 (or Engineering 311 and 340), Physics 305 and Mathematics 211.

UNDERGRADUATE COURSES IN PHYSICS FOR THE HONOURS DEGREE

(for a student entering at the second year level)

First Year — 205 Seven hours per week, all year.

Second Year — 304 Six hours per week, all year.

305 Six hours per week, all year.

Third Year — 310 Two hours per week, all year.

330 Half Course, three hrs. per week, *first* term.

315 Two hrs. per week, all year.

420 Three hrs. per week, all year.

325 Half Course, three hrs. per week, *second* term.

340 Six hrs. per week, all year.

345 Three hrs. per week, all year.

Fourth Year — 410 Half Course, three hrs. per week, *first* term.

425 Half Course, three hrs. per week, *first* term.

435 Three hrs. per week, all year.

418 Half Course, three hrs. per week, *second* term.

430 Half Course, three hrs. per week, *second* term.

450 Three hrs. per week, all year.

460 At least six hrs. per week, all year.

POLITICAL SCIENCE

<i>Professors</i>	R. O. MacFarlane, M.A., Ph.D. D. C. Rowat, A.M., Ph.D.
<i>Associate Professor; Chairman of the Department</i> , 1961-62	D. G. Anglin, M.A., D.Phil.
<i>Associate Professors</i>	Pauline Jewett, M.A., Ph.D. (on leave of absence, 1961-62) K. D. McRae, A.M., Ph.D. (on leave of absence, 1961-62)
<i>Visiting Professor</i>	R. A. MacKay, B.A., Ph.D., LL.D., F.R.S.C.
<i>Lecturer</i>	Duncan Edmonds, B.A.
<i>Sessional Lecturers</i>	Rodney Grey, M.A., Ph.D., R. P. Armstrong, B.A., C. S. Juvet, M.A., Peter Roberts, M.A., J. H. Scarffe, M.A., A. M. Willms, M.A.

Ottawa provides a wealth of resources, both in personnel and in research materials, for the student of government, politics, public administration, and international relations. Undergraduates will be assisted in making the fullest use of these unique advantages of the national capital.

NORMAL SEQUENCE OF COURSES

First Year (Majors and Honours): Political Science 210.

Second Year (Majors and Honours): Political Science 310, 335, 360, 380; also Political Science 315, 320, 330, with permission.

Third Year (Majors and Honours): Political Science 315, 320, 330, 340, 365, 385; also any Second year course not already taken.

Fourth Year (Honours): Political Science 390; any Third year course not already taken; one or two of the following graduate courses, with permission: Political Science 510, 525, 540, 550, 580.

Students who wish to major or take honours in Political Science will be expected to fulfill the summer reading requirements at the beginning of their Second year.

PASS COURSE

A major in Political Science (or a combined major including Political Science) requires at least five courses in the Department, including Political Science 210 and 360. The entire program must be approved by the Chairman of the Department.

HONOURS COURSE

Honours programs may be entered from the Honours First year in the Social Sciences (see pp. 67-69), or by transfer from the Pass Course if second class standing or better has been obtained. The following programs are available:

Political Science. For full honours, nine courses in Political Science will be required, including Political Science 210, 360, 380, 390, and 320 or 340. Candidates will normally be asked to present a graduation essay on some topic involving independent investigation, the subject to be chosen in consultation with the Department. They must select a minor field or fields, preferably in Economics, History, Philosophy or Sociology, and by the final year must show a reading knowledge of a language other than English, preferably French, German, or Russian.

Political Science and Economics. Political Science and History. Political Science and Sociology. Students intending to enter one of these programs should if possible take Political Science 210 and the other introductory course in their First year. The choice of courses in subsequent years will be subject to the approval of the chairmen of the two departments.

The honours requirement in *Political Science and Economics* includes at least six courses in each discipline, one of which must be Political Science 390 or Economics 495, to be taken in the student's final year.

The honours requirement in *Political Science and History* includes at least seven courses in each discipline, one of which must be Political Science 390 or History 396, to be taken in the student's final year.

The honours requirement in *Political Science and Sociology* includes at least six courses in each discipline, and in addition to Political Science 210 and Sociology 210 must include Political Science 360 or 365, three of Political Science 310, 315, 320, 330, and 335; Sociology 362, and three of Sociology 345, 364, 366, 367, 368, and 400. In his final year the student will also take either Political Science 390 or Sociology 490.

All combined honours programs will be arranged so that the student may transfer to full honours in Political Science or to full honours in the other field at the end of the Third year, if he then wishes to specialize more intensively.

Public Administration. The Honours program in Public Administration is outlined on pp. 51-54.

Honours and combined honours students will not be required to write final examinations in their Political Science courses in their final year. There will, however, be a written comprehensive examination.

GRADUATE STUDIES

The Department offers studies leading to the degree of Master of Arts in areas of political science for which adequate study materials are available. For further information consult the Department. Graduate programs in Public Administration are outlined on pp. 55-57.

POLITICAL SCIENCE 210.[2]. *Introduction to Political Science*

An introduction to the theory and practice of modern political ideas and institutions, with particular attention to the structure of the government of Canada.

Day Division: Annually (lectures and discussion three hours a week).

Evening Division: Annually (lectures and discussion three hours a week).

Also Summer 1961 (lectures and discussion five hours a week).

Members of the Department

POLITICAL SCIENCE 310.[3]. *Western European Governments*

A comparative study of government and politics in Great Britain, France, and other European democracies.

PREREQUISITE: Political Science 210.

Day and Evening Division: 1962-63 and alternate years.

POLITICAL SCIENCE 315. *The Commonwealth in Asia and Africa*

A comparative study of the evolution and working of political institutions in India, Pakistan, Ceylon, Malaya, Nigeria, Ghana and the Union of South Africa, and in selected British territories elsewhere in Asia and Africa (and the West Indies) at various stages of development. Some attention will be paid to the nature and organization of the modern Commonwealth and to the colonial policies of other powers.

PREREQUISITE: Political Science 210.

Day and Evening Division: 1961-62 and alternate years (lectures and discussion three hours a week).

Professor Anglin

POLITICAL SCIENCE 320.[11]. *Canadian Federalism*

An analysis of the Canadian federal system, and of federalism generally, including such matters as the written constitution; trends in judicial interpretation and the nature of the judicial process; problems of constitutional amendment, disallowance and reservation; political, economic and administrative relations between central and provincial governments; the impact of federalism on governmental institutions; the role of political parties in province and nation; the relationship between federalism, political parties, and democracy.

PREREQUISITE: Political Science 210.

Evening Division: 1961-62 and alternate years (lectures and discussion three hours a week).

Day Division: 1962-63 and alternate years.

Dr. Grey

POLITICAL SCIENCE 330.[13]. *Soviet Russia*

An introduction to the study of the U.S.S.R., with emphasis on systematic political analysis: the historical and geographical background; the evolution, organization and interrelation of Soviet institutions; Russian and Marxist influences on their shape and function; domestic and foreign problems and policy; a comparison of goal and achievement; the meaning of the Soviet experiment.

PREREQUISITE: Preferably Political Science 210 and a further course in Political Science.

Evening Division: Annually (lectures and discussion three hours a week).

Mr. Roberts

POLITICAL SCIENCE 335.[8]. *Government and Politics in the United States*

A survey of American political thought and constitutional development and an analysis of the American governmental process, with particular reference to the role of political parties and pressure groups.

PREREQUISITE: Political Science 210.

Day Division: 1961-62 and alternate years (lectures and discussion three hours a week).

Mr. Edmonds

POLITICAL SCIENCE 340.[6]. *Problems in Public Administration*

A comprehensive survey of problems in Canadian public administration, with concentration on those at the national level. The course includes an examination of departmental organization in theory and practice, informal organization and the human element, semi-independent agencies, intergovernmental administration, the dynamics of management (decision-making, planning, coordinating, etc.), financial and personnel administration administrative discretion, and the system of responsibility in a democracy. The seminar work includes use of the case-study technique as developed at Harvard University.

TEXTS: Simon *et al.*, *Public Administration*.

Cole, *The Canadian Bureaucracy*.

Buck, *Financing Canadian Government*.

Institute of Public Administration of Canada, *Proceedings*.

PREREQUISITE: Political Science 210, and preferably a further course in Political Science.

Evening Division: 1961-62 and alternate years (lectures and discussion three hours a week).

Day and Evening Division: 1962-63 and alternate years.

Professor Rowat

POLITICAL SCIENCE 360.[4]. *History of Political Thoughts*

A general survey of the history of some phases of thought, with special reference to political theory, from ancient times to the close of the eighteenth century. A course in ideas, their sources, their validity, and their significance. Some of the works of the following authors are among the material considered: Plato, Aristotle, Machiavelli, Bodin, Hobbes, Locke, Rousseau, and Burke.

PREREQUISITE: Political Science 210, or permission of the Department.

Day Division: 1961-62 and alternate years (lectures and discussion three hours a week).

Evening Division: 1962-63 and alternate years.

Professor MacKay

POLITICAL SCIENCE 365. *Modern Political Thought*

A seminar on the major political ideas of the nineteenth and twentieth centuries, and on some of the currents in intellectual history which have contributed to their development.

PREREQUISITE: Political Science 360, or permission of the Department.

Not offered, 1961-62.

Day and Evening Division, 1962-63.

POLITICAL SCIENCE 380. *International Politics*

An introduction to the study of international politics, particularly in the period from 1939 to the present, with some attention to the problems of international organization.

PREREQUISITE: Political Science 210, or permission of the Department.

Day Division: Annually (lectures and discussion three hours a week).

Professor Anglin

POLITICAL SCIENCE 385. *International Institutions*

A study of the origins, structure and functioning of modern international institutions, with special emphasis on the League of Nations, the United Nations, and regional co-operation in Europe and the Atlantic community. The major constitutional and political problems of international organization will be considered against the background of world affairs in general.

PREREQUISITE: Political Science 380 or History 380, or permission of the Department.

Day and Evening Division: 1962-63 and alternate years.

POLITICAL SCIENCE 390.[14]. *Tutorial in Political or Administrative Research*

This course, for honours students and for students taking the Diploma in Public Administration, is designed for training in research techniques and for the discussion and criticism of honour graduation essays, and other special research projects pursued under the auspices of the Department in connection with the facilities available in the Public Archives of Canada, the Library of Parliament, and the government departments.

Day Division: Annually (hours arranged).

Members of the Department

GRADUATE COURSES

POLITICAL SCIENCE 510. *The Political Process*

An analytic and comparative study of the democratic political process with particular reference to political parties and elections, pressure groups, public opinion, and political leadership.

PREREQUISITE: Permission of the Department.

Not offered, 1961-62.

Day and Evening Division: 1962-63 (seminar three hours a week).

POLITICAL SCIENCE 525.[325]. *Government of Canada*

A seminar on topics in Canadian government. Reports will be presented and discussed in class on such topics as institutions, procedures, politics, group influences and control agencies.

PREREQUISITE: Permission of the Department.

Day and Evening Division: 1961-62 and alternate years (seminar three hours a week).

Evening Division: 1962-63 and alternate years.

Professor MacFarlane

POLITICAL SCIENCE 540. *Theory and Practice of Administration*

An advanced seminar in which reports will be presented and discussed on specific problems in public administration. Senior government officials will take part in the seminar from time to time.

PREREQUISITE: Political Science 340 (or equivalent) and permission of the Department.

Evening Division: Annually (seminar three hours a week).

Professor MacFarlane

POLITICAL SCIENCE 550.[17, 350]. *Provincial and Municipal Government*

An advanced course dealing with problems of provincial and municipal government and administration, and with problems of inter-governmental relations.

PREREQUISITE: Permission of the Department.

Day and Evening Division: Annually (seminar three hours a week).

Professors MacFarlane and Rowat

POLITICAL SCIENCE 580. *Canada in World Affairs*

An analysis of Canada's external policy and her role in international affairs with special emphasis on the period since 1939.

PREREQUISITE: Permission of the Department.

Day and Evening Division: 1961-62 (seminar three hours a week).

Professors MacKay and Anglin

POLITICAL SCIENCE 590. *Directed Study in a Selected Field*

This course will be conducted as a tutorial (a) for students taking the M.A. degree in Public Administration who elect to write a research essay rather than a thesis; and (b) for students taking the M.A. degree in Political Science who wish to undertake specialized research in an area related to their thesis.

PREREQUISITE: Permission of the Department.

Day Division: Annually (hours arranged).

Members of the Department

See also:

SOCIOLOGY 364. *Political Behaviour*

SOCIOLOGY 368. *Power and Stratification*

HISTORY 380. *An Introduction to the History of International Relations, 1900-1939*

PUBLIC LAW 310. *The Elements of Public Law*

PUBLIC LAW 510. *Administrative Law*

PSYCHOLOGY

Associate Professor; Chairman of the Department, 1961-62 F. R. Wake, B.A., Ph.D.

Associate Professors . . . R. A. Wendt, M.A., M. Nancy Donald, M.A., Ph.D.

Sessional Lecturers A. B. Laver, M.A.

H. J. Breen, M.A., Ph.D., June Pimm, M.S.Ps., W. R. N. Blair, Ph.D.

In order to complete a degree with a major in Psychology, the student must have credit for the following: Psychology 210, 305, 390; Economics 320 or Mathematics 230, 235, and two additional courses in Psychology. Psychology majors are required to complete the Summer Reading Requirement.

The Department of Psychology pursues a policy of integrating classroom work with observation periods, field trips, and research projects within the many and varied institutions in and about the City of Ottawa. Such a policy permits the student to see the importance of theoretical studies to the practical applications in human behaviour.

PSYCHOLOGY 210. [2]. *General Psychology*

A survey of psychology. A systematic study of perception, motivation, learning, emotion, and thought. The psychology of individual differences in intelligence, aptitude, and personality. Psychology applied to study habits, careers, and personal adjustment. Contemporary psychological theories. (A student may not obtain credit for both Psychology 210 and 220).

TEXT: To be announced.

Day Division: Annually (lectures three hours a week).

Evening Division: Annually (lectures two hours a week).

Professor Wake and Mr. Laver

PSYCHOLOGY 220. *Applied Psychology*

The study and application of principles of human behavior in the fields of industry, business, and government. Designed to be of value to students in engineering, science and other practical professions who may not be able to pursue the study of psychology further. (A student may not obtain credit for both Psychology 210 and 220.)

PREREQUISITE: None.

Evening Division: 1961-62 (lectures two hours a week).

Dr. Blair

PSYCHOLOGY 305. *Experimental Psychology*

An introduction to psychological research, including an examination of methods, theories, and preparation of reports. A number of experiments will be carried out in the laboratory.

TEXT: To be announced.

PREREQUISITE: Psychology 210, which may be taken concurrently; or permission of the Department.

Day Division: Annually (two two-hour laboratory periods a week).

Evening Division: Annually (two two-hour laboratory periods a week).

Professor Wendt

PSYCHOLOGY 310. *Social Psychology*

Theoretical and methodological approaches to social psychological problems.

TEXT: To be announced.

PREREQUISITES: Psychology 210 or Sociology 210.

Day Division: Not offered, 1961-62.

Evening Division: 1961-62 (three hours a week).

Professor Donald

PSYCHOLOGY 320.[5]. *Child Psychology*

This course traces the growth and development of the child from birth through adolescence. Students will carry out a research project. Field trips will be arranged.

PREREQUISITE: Psychology 210.

Day Division: 1961-62 (lectures three hours a week).

Evening Division: Not offered, 1961-62.

Professor Wake

PSYCHOLOGY 331.[330, 335]. *Foundations of Psychological Testing*

Theoretical foundations for construction, standardization, and application of psychological tests. Survey of types and uses of current test material.

TEXT: To be announced.

PREREQUISITES: Psychology 210; Economics 320 or Mathematics 230, 235 (may be taken concurrently).

Day Division: 1961-62 (lectures two hours a week).

Professor Donald

PSYCHOLOGY 340. *Personnel Psychology* [4, Personnel Management 100]

Applications of psychological theory and techniques to problems of organizational functioning and worker motivation.

TEXT: To be announced.

PREREQUISITES: Psychology 210. Recommended: Psychology 331.

Day Division: 1961-62 (lectures three hours a week).

Evening Division: Not offered, 1961-62.

PSYCHOLOGY 345. *Personnel Psychology II*

This course considers the contribution of psychology to business, industry, civil service, etc., including labour-management relations, job-analysis, advertising, working conditions, publications.

TEXT: To be announced.

PREREQUISITES: Psychology 210, and Psychology 340 or permission of the Department.

Not offered, 1961-62.

PSYCHOLOGY 370. [7]. *Theory of Personality*

This course deals with theories of personality and considerations of processes of normal and abnormal behaviour. The course introduces techniques of personality evaluation which serve as indicators of normal and abnormal adjustments.

TEXTS: To be announced.

PREREQUISITE: Psychology 210.

Day Division: Not offered, 1961-62.

Evening Division: 1961-62 (lectures two hours a week).

PSYCHOLOGY 380. *Psychoanalysis and Motivation*

This course presents a general survey of the important contributions of the various psycho-analytic schools. Common popular misconceptions about psychoanalysis will be discussed and clarified. An attempt will be made to provide a meaningful integration of the basic discoveries of the major "classical" analysis (Freud, Jung, and Adler), and those of the "modern" school (Fromm, Horney, et al). These concepts will be evaluated within the framework of the psychology of motivation, learning, and perception.

PREREQUISITE: Psychology 310, or 320, or 370, or permission of the Department.

Evening Division: 1961-62 (discussion seminar, two hours a week).

Dr. Breen

PSYCHOLOGY 390. *History of Psychology*

The course pursues the growth of psychology as a science. Emphasis is given to the treatment of persisting psychological problems in various theories of the past and the continuing significance of these problems in modern systematic theory.

TEXTS: To be announced.

PREREQUISITE: Psychology 210. Open to Third year students only.

Evening Division: 1961-62 (seminar two hours a week).

Professor Wendt

PSYCHOLOGY 505. *Advanced Design of Psychological Experiments*

This course explores the design of experiments through measures of central tendency, correlation, analysis of variance and co-variance, and other advanced techniques. The student will be required to display a well-founded knowledge of the logic basic to research, as well as true competence in computation.

PREREQUISITE: B.A. with major in psychology and permission of department.

TEXT: To be announced.

Not offered, 1961-62.

PSYCHOLOGY 510. *Learning*

This course will cover the historical development of important learning theories from Aristotle to date. Emphasis will be placed on contributions of each theory to current understanding of human behaviour.

TEXTS: To be announced.

PREREQUISITE: B.A. with major in psychology and permission of the department.

Evening Division: Not offered, 1961-62.

PSYCHOLOGY 520. *Perception*

The course in perception will cover the physiological basis of sensation and perception; the philosophical and historical development of perceptual theory in the last five hundred years.

PREREQUISITE: B.A. with major in psychology and permission of the department.

Evening Division: Not offered, 1961-62.

PUBLIC ADMINISTRATION

(See Political Science)

PUBLIC LAW

Chairman of the Department, 1961-62 . . . R. O. MacFarlane, M.A., Ph.D.

Sessional Lecturers . . . G. F. Henderson, Q.C., B.A.

A. A. Cattnach, Q.C., B.A., LL.B.

PUBLIC LAW 310. [1, 100]. *The Elements of Public Law*

An introduction to the study of law, designed to acquaint the non-lawyer with the principal institutions, concepts, and classifications of the law, with special reference to Canada.

Evening Division: Annually (lectures 2½ hours a week, seminars arranged).

Mr. Henderson

PUBLIC LAW 510. [320. 3, 103]. *Administrative Law*

This course is designed as a study of the field of administrative law in the light of current social and economic problems and relationships and in the light of the trends of modern legislation, with particular reference to Canada. Theories influencing development in the field; delegated legislation and delegated adjudicative power, their nature and extent, reasons for delegation, dangers; judicial and extra-judicial review and control; administrative procedure; suggested reforms.

PREREQUISITE: Public Law 310 or permission of the Department.

Evening Division: Annually (lectures 2½ hours a week, seminars arranged).

Mr. Cattnach

See also History 330, *Canada from 1791*

Political Science 320, *Canadian Federalism*

RELIGION

Assistant Professor; Chairman of the Department, 1961-62 L. M. Read, M.A.
Assistant Professor (Department of History) D. G. Bowen, M.A.
Sessional Lecturers Simon L. Eckstein, B.A., B.R.E., M.A.
 J. A. Baycroft, M.A.

The general purpose of courses offered in this department is to promote a sensitive and intellectually mature understanding of the basic ideas and concerns of outstanding religious leaders and movements, primarily in the Judaeo-Christian tradition, irrespective of whether these coincide or conflict with individual convictions. Religious writings are studied critically in an attempt to understand their meaning, to grapple with their problems, and to assess their significance both in their original cultural context and for our own situation.

As general introduction, students are advised to take Religion 215 or 220 or both. If two or more courses are taken in the department, students are advised to make Religion 220 one of these. In 1961-62 other courses may be taken without previous work in the department.

RELIGION 215. *Introduction to World Religions*

A survey of eastern religions: Hinduism, Buddhism, Taoism, Confucianism and Shinto. A survey of "western" religions: Zoroastrianism, Judaism and Christianity (brief review of major emphases only) and Islam. Some aspects of primitive religions and the religions of the ancient Near-East, Greece and Rome. Representative sociological, psychological and philosophical theories of the character of religion. (Course credits cannot be obtained for both Religion 320, taken in 1960-61 or earlier, and Religion 215).

Evening Division: 1961-62 (lectures two hours a week).

Mr. Eckstein

RELIGION 220. *Introduction to the Bible*

This course will survey the historical background, formation of the literature, and main teachings of the Bible. Text, Canon and translations. The history of Israel and development of Hebrew literature; the major concepts of Hebrew religion; the great prophets; the inter-testamental period. Jewish sects and literature in the New Testament times, including apocalyptic writings and the Dead Sea Scrolls; Hellenistic religion; the contribution of Source and Form Criticism to the interpretation of the Synoptic Gospels; the teaching of Jesus; letters and teaching of Paul; the Johannine writings; the book of Revelation.

Day Division: 1961-62 (lectures two hours a week).

Mr. Baycroft

RELIGION 310. *History of the Church and Christian Thought*

The course will survey the influence of the Church in Western society from its beginning to the present day and be concerned with both the history of the Church as an institution and the history of Christianity as a system of religious thought. (The course is listed also as History 310.)

Day Division: 1961-62 (lectures and discussion three hours a week).

Professor Bowen

RELIGION 320. *The Great Non-Christian Religions*

Offered in 1961-62 as Religion 215.

RELIGION 330. *Judaism and the Jewish People*

The first half of the course will survey the history of Judaism and the Jewish People from earliest times to the present day emphasizing the major factors, both external and internal, influencing their development. The Biblical period; prophecy; the second commonwealth; the Talmudic era; the golden age in Spain; the medieval Jewish community; the modern period; Zionism; the contemporary scene. The second half of the course will review the basic beliefs and practices of Judaism. The thirteen principles of Maimonides; the Synagogue, its rituals and practices; the Jewish home and family; the Jewish holy days, fasts and festivals; dietary laws; marriage and divorce laws; mourning customs; problems, trends and movements in contemporary Judaism. (Course credit cannot be obtained for both Religion 210, taken in 1960-61 or earlier, and Religion 330.)

TEXTS: M. Margolis and A. Marx — *A History of the Jewish People*

Isidore Epstein — *Judaism*

Evening Division: To be offered in 1962-63.

RELIGION 340. *Records of the Life of Jesus*

The course will be concerned with a systematic, critical, and appreciative study of the available records of the life of Jesus. Class periods will be mainly taken up with free class discussions of successive sections of the records making use of H. B. Sharman's *Records of the Life of Jesus* (containing the synoptic gospels, Matthew, Mark and Luke, in parallel form and the gospel of John with cross references). There will be accompanying lectures and readings on the historical context of the life of Jesus and on the historical context in which the records appeared.

Day and Evening Division: 1961-62 (three hours a week).

Professor Read

RELIGION 350. *Philosophy and Religion*

(Offered in the Department of Philosophy as Philosophy 350).

RELIGION 370. *Christian Ethics and Society*

The ethical teachings of Biblical Judaism, Jesus and the early church, and major types of interpretation of Christian ethics. A number of problems of principle will be studied in detail, for example, law and love, agape and eros, the freedom of man and the sovereignty of God; and a number of problems of social responsibility, for example, nationalism and war, democracy and dictatorship, Christianity and the rise of capitalism, Christianity and communism.

Not offered, 1961-62.

RELIGION 390. *Seminar: The Nature and Destiny of Man*

With the participation of members of faculty from the sciences, social sciences, and humanities as well as religion, a critical examination will be made of present and potential contributions of the various disciplines either in conclusions or methodology to an understanding of the nature of man himself and his appropriate destiny.

PREREQUISITE: Recommendation of a participating member of faculty.

Not offered, 1961-62.

RUSSIAN

<i>Lecturer</i>	J. G. Garrard, M.A.
<i>Special Lecturer</i>	G. Belkov, M.A.
<i>Sessional Lecturer (Honorary)</i>	D. Lalkow, M.D.

Undergraduates wishing to major in Russian Language and Literature should consult the Department as soon as possible in order to plan their programs.

An undergraduate who majors in Russian is required to take five advanced courses, of which 341 and 345 are obligatory; and also to pass an oral examination which will be held towards the end of the undergraduate's final year. The normal course pattern after satisfactory completion of Russian 215 is, in the Second year: 341, which is obligatory and carries no university credit, and 345 (also obligatory); in the Third year: three of the following — 301, 302, 325, 331, 332, and 390. This last course is available only to undergraduates who show exceptional ability.

The attention of prospective majors is directed to the following courses in related fields: Economics 470, Geography 360, Political Science 330.

RUSSIAN 115.

Introductory course, the aim of which is to ensure an adequate grasp of the mechanics of the language. Undergraduates will supplement their studies by reading simplified texts and using language laboratory equipment.

TEXT: Fayer, Pressman, Pressman, *Simplified Russian Grammar* (Pitman).

Day and Evening Divisions: Annually (three hours a week).

Mr. Garrard, Mr. Belkov

RUSSIAN 215.

Undergraduates will read extracts from the Soviet press and later from nineteenth and twentieth century authors, as well as complete their study of Russian grammar. Undergraduates will also receive practice in consecutive translation to and from Russian.

TEXTS: N. F. Potapova, *Elementary Grammar*, Part II (Moscow, 1958)

Selected press passages for Russian 215

L. N. Tolstoy, *Fables, Tales, Stories* (Moscow, 1960)

PREREQUISITE: Russian 115.

Day and Evening Divisions: Annually (three hours a week).

Mr. Garrard

RUSSIAN 301. *Nineteenth century prose fiction*

TEXTS: Coulson and Duddington, *Russian Short Stories*

Birkett and Struve, *Selected Short Stories of Anton Chekhov*

Duddington and Gorodetzky, *Tolstoy Selections*

Day Division: 1961-62 (two hours a week).

Mr. Garrard

RUSSIAN 302. *Russian prose fiction since 1917*

TEXT: R. N. Hingley, *Soviet Prose: a Reader*

CRITICAL WORKS: Gleb Struve, *Soviet Russian Literature 1917-1950*

E. J. Brown, *The Proletarian Episode in Russian Literature*

R. Mathewson, *The Positive Hero in Russian Literature*

Day Division: 1961-62 (two hours a week).

Mr. Garrard

RUSSIAN 325. *Beginning of the Golden Age: Pushkin and Lermontov*

TEXTS: Pushkin, *Povesti Belkina* (Stantsionny smotritel), *Evgeny Onegin* (Chizhevsky's Edition), *Medny vsadnik*, *Selected lyrics*; Lermontov, *Geroi nashego vremeni*, *Selected lyrics*.

Lermontov, *Geroi nashego vremeni*

Selected lyrics

CRITICAL WORKS: Mirsky, *Pushkin*, Hofmann, *Pouchkine*, Lednicky, *Pushkin's Bronze Horseman*, Duchesne, *M. I. Lermontov: sa vie et ses oeuvres*, Lavrin, *Lermontov*.

Day Division: 1961-62 (two hours a week).

Mr. Garrard

RUSSIAN 331. *Russian drama of the nineteenth century*

Undergraduates will read selected plays by Pushkin, Griboyedov, Gogol, Ostrovsky, A. Tolstoy and Chekhov.

RUSSIAN 332. *Soviet Drama*

REFERENCE WORKS: Gorchakov, *The Theatre in Soviet Russia*

Evreinov, *Le Théâtre en Russie soviétique*

RUSSIAN 341. *The Course of Russian History*

This course, which is designed to give an adequate historical background, must be taken by undergraduates majoring in Russian Language and Literature. It carries no university credit.

REFERENCE WORKS: Dvornik, *The Slavs: Their Early History and Civilization* Kliuchevsky, *History of Russia* (5 vols.), Pares, *History of Russia*, Sumner, *Survey of Russian History*, Wren, *Course of Russian History*.

Day Division: 1961-62 (one hour a week).

Mr. Garrard

RUSSIAN 345. *Outline of Russian Literature*

This course, which is designed to familiarise undergraduates with the general development of modern Russian literature, is obligatory for undergraduates majoring in Russian Language and Literature.

TEXT: Literary Chestomathy for Russian 345

REFERENCE WORKS: Mirsky, *History of Russian Literature*, Slonim, *Epic of Russian Literature*, Chizhevsky's, *History of Old Russian Literature*, Hofmann, Lozinsky, and Motchoulsky, *Histoire de la littérature russe*.

Day Division: 1961-62 (two hours a week).

Mr. Garrard

RUSSIAN 377. *Interpretership*

This course may be taken only by undergraduates majoring in Russian language and literature. Undergraduates will receive practice in written consecutive translation, followed by direct oral interpreting on a variety of subjects at most conferences.

RUSSIAN 390.

This course may be taken only by undergraduates majoring in Russian Language and Literature. In consultation with the Department, undergraduates will choose two authors, one verse and one prose fiction writer, whose major works they will then study in detail. Weekly tutorials to be arranged.

SOCIOLOGY

Associate Professor J. A. Porter, B.Sc. (Econ.)
(on leave of absence, 1961-62)

Assistant Professor; Chairman of the Department, 1961-62

Muni C. Frumhartz, B.A., A.M.

Assistant Professor Bruce A. McFarlane, M.A.

Lecturer Hyman Burshtyn, M.A.

Sessional Lecturers Kenneth P. Adler, M.A., Ph.D.
T. F. S. McFeat, B.A., Ph.D., Alan H. Portigal, B.Sc., A.M.

Students who wish to major or to take Honours in Sociology are expected to fulfill the summer reading requirements at the beginning of their Second year.

A student who took Sociology 220 in previous years may substitute it for Sociology 210 as an introduction to the Department and as a prerequisite for advanced courses.

PASS COURSE

Students who major in Sociology are normally required to take at least six courses in the major field. These include Sociology 210, 362 and 400, which are most appropriately taken in the First, Second and Third years, respectively. The rest of the course program is to be worked out in consultation with the Chairman of the Department. It is expected that some work will be taken in related disciplines, the most important of which are: Economics, Geography, History, Political Science, and Psychology.

HONOURS COURSES

Honours programs may be entered from the Honours First year in the Social Sciences (see pp. 67-69) or by transfer from the Pass course if second-class standing has been obtained. Students taking honours in Sociology are expected to meet the general University regulations governing the degree and to fulfil certain additional requirements depending upon the program selected. The following programs are available:

Sociology. The entire selection of courses is to be worked out in close consultation with the Chairman of the Department and is subject to his approval. Normally, the requirements consist of:

1. Ten courses in Sociology, including:
 - a. Sociology 210, 362 and 400 (most appropriately taken in the First, Second and Third years, respectively)
 - b. At least one of Sociology 320, 335 and 345
 - c. At least two of Sociology 364, 366, 367, 368, 370, 375 and 450
 - d. Sociology 355
 - e. Sociology 490 in the final year.
2. A minor, consisting of three courses in one of the allied social sciences (Economics, History, Political Science or Psychology).
3. A comprehensive examination at the end of the final year.

Sociology and Political Science. Students intending to enter this program should take Political Science 210 or Sociology 210 (preferably both) in the First year. The choice of courses in subsequent years is subject to the approval of the chairmen of the two departments. Normally, the requirements consist of:

1. At least six courses in each of the two disciplines, including:
 - a. Political Science: 210, one of 360 or 365, and three of 310, 315, 320, 330 and 335
 - b. Sociology: 210 and 362, and three of 345, 364, 366, 367, 368 and 400
 - c. Political Science 390 or Sociology 490 in the final year.
2. A comprehensive examination at the end of the final year.

The program will be so arranged that the student may transfer to full honours in either of the two fields at the end of the Third year, if he then wishes to specialize more intensively.

Consideration will also be given to applications for Combined Honours in Sociology and Economics or in Sociology and another related discipline.

Honours and combined honours students will not be required to write final-year examinations in their sociology courses.

GRADUATE STUDIES

The Department of Sociology offers studies leading to the degree of Master of Arts. A student wishing to enter the M.A. program must have an Honours degree in Sociology or its equivalent. Otherwise, he will ordinarily be expected to take a qualifying year (of five courses designated by the Department) before being admitted to M.A. candidacy.

A candidate for the M.A. in Sociology will (1) take three graduate seminars within the Department, (2) present a thesis, (3) write comprehensive examinations in the general field of Sociology, and (4) defend his thesis at an oral examination. Grades of B or better must be obtained in all of these. Normally, the student will also be required to have had training — or, in some other way, to demonstrate his competence — in social research and in statistics before completing his program. He will, in addition, be expected to have a reading knowledge of a foreign language approved by the Department.

At present the graduate program is offered in the Evening Division only, although the qualifying year may be taken in the Day Division. A student entering the M.A. program without the necessity of qualification will, therefore, ordinarily take three years to complete his requirements for the degree.

The general regulations governing graduate studies are set out on pp. 70-72 of this Calendar.

SOCIOLOGY 210. [1, 220]. *Introduction to Sociology*

An introduction to the basic principles and concepts of sociological study. An examination of the elements of social structure and of social behaviour — social relations, social groups, cultural norms and values, and institutions — against the background of both simple and complex societies.

Day Division: Annually (lectures and discussion three hours a week).

Evening Division: Annually (lectures and discussion three hours a week).

Summer Session: 1961 (lectures and discussion five hours a week).

Members of the Department

SOCIOLOGY 310. [6]. *Social Psychology*

(Offered in the Department of Psychology as Psychology 310.)

SOCIOLOGY 320. *Cultural Anthropology*

This course deals mainly with the characteristics of human nature, the development and differentiation of human culture, theories relating to culture, society and personality, kinship, language, art, value systems and cultural dynamics.

PREREQUISITE: Sociology 210 or permission of the instructor.

Day Division: Not offered, 1961-62.

Evening Division: 1961-62 (lectures and discussion two hours a week).

Dr. McFeat

SOCIOLOGY 335. *Social and Cultural Change*

An examination within the framework of structural-functional theory of the patterns, processes, and causes of social and cultural change. An analysis, also, of both the specific and the general evolution of culture.

PREREQUISITE: Sociology 210 or permission of the instructor.

Not offered, 1961-62.

SOCIOLOGY 345. *The Ethnography of French Canada*

A course designed to present an anthropological analysis of the French Canadian way of life including major elements such as politics, religion, social structure, cultural values and literature. This ethnic group will be considered both in its historical development and present situation with the aim of understanding it from a global point of view.

PREREQUISITE: Sociology 210 or permission of the instructor.

Not offered, 1961-62.

SOCIOLOGY 355. *Statistical Methods in the Social Sciences*

(Offered in the Department of Economics as Economics 320.)

SOCIOLOGY 362. *Social Research*

Lectures, seminars, and exercises dealing with sociological method and, more particularly, with the techniques of social research. Special attention is paid to sampling, questionnaires and interviews, observational techniques, sociometry, personal documents, and content analysis. During the course the student will apply these techniques to some specific research project of his own.

PREREQUISITE: Sociology 210 or permission of the Department.

Day Division: Not offered, 1961-62.

Evening Division: 1961-62 (lectures and seminars two hours a week).

Dr. Adler

SOCIOLOGY 364. *Political Behaviour*

An examination of sociological contributions to the study of political behaviour and of the relations between politics and the social structure. The areas of primary interest include: the politically relevant aspects of the media of mass communication, the determinants and role of public opinion, voting and other forms of political participation, the internal politics of parties and other associations, and the structure and functions of social and political movements.

PREREQUISITE: Sociology 210 or permission of the instructor.

Day and Evening Divisions: 1961-62 (lectures and discussion three hours a week).

Professor Frumhartz

SOCIOLOGY 366. *Sociology of Work*

A study of the sociological aspects of work in contemporary society, with attention also to comparative analysis and historical trends: the social organization of modern industry and business, sociological analysis of selected occupations, and the relation between occupational activities and organizations and their social and institutional setting.

PREREQUISITE: Sociology 210 or permission of the instructor.

Day and Evening Divisions: 1961-62 (lectures and discussion two hours a week).

Professor McFarlane

SOCIOLOGY 367. *Complex Social Systems*

A study of the structure and dynamics of complex societies and of their component organizational systems. The first part of the course examines modern urban, industrial society in its associational, mass, and totalitarian modes. The second part is primarily concerned with the formal structure and bureaucratic organization of industry and work, the labour movement, government and politics, education and leisure.

PREREQUISITE: Sociology 210 or permission of the instructor.

Not offered, 1961-62.

SOCIOLOGY 368. *Power and Stratification*

An analysis of political power, institutions and parties based on empirical studies of political elites. The relationships between political, economic, and social power. The psychology of political movements. Criteria of social class and social status. Relationships between social class and economic and political systems. Social mobility. Examination of various class and caste systems and their ideologies.

PREREQUISITE: Sociology 210 or permission of the instructor.

Not offered, 1961-62.

SOCIOLOGY 370.[5]. *The Primary Group*

An examination of small face-to-face groups and their relationship to the social structure of the larger society. Particular attention will be paid to the family, children's play groups, juvenile gangs, and the industrial working group.

PREREQUISITE: Sociology 210 or permission of the instructor.

Day Division: 1961-62 (lectures and discussion three hours a week).

Mr. Burshtyn

SOCIOLOGY 375. *Sociology of Deviance*

An analysis of the relation of deviant behaviour to the functioning of social systems: conditions and types of deviance from the institutional order, the evasion of rules, the social roles of deviants, the structure of control, punishment and cure.

PREREQUISITE: Sociology 210 or permission of the Instructor.

Day Division: 1961-62 (lectures and discussion three hours a week).

Evening Division: *Not offered, 1961-62.*

Mr. Burshtyn

SOCIOLOGY 400.[2, 360]. *Sociological Theory*

A survey of the rise of modern Sociology and of the history of sociological theory, with special reference to the contributions of Marx, Durkheim, Pareto, Weber and Parsons. The latter part of the course also includes an examination of several substantive areas of Sociology from the standpoint of systematic theory.

PREREQUISITES: Sociology 210 and Third year standing.

Day Division: 1961-62 (seminar three hours a week).

Professor Frumhartz

SOCIOLOGY 450. [350]. *Tutorial in Sociology or Anthropology*

A course designed to permit a student to pursue his interests in a particular area of Sociology or Anthropology. During the year, the student will prepare papers as the basis for discussions with his tutor.

PREREQUISITES: Sociology 210, Third year standing and permission of the Chairman of the Department.

Day and Evening Divisions: Annually (tutorial hours arranged).

Members of the Department

SOCIOLOGY 490. [390]. *Honours Thesis*

At the end of the final year an Honours candidate will be required to present a major essay based upon a supervised research project. The subject for research will be arranged early in the year in consultation with the Department and an advisor will be assigned. The student will be orally examined upon his thesis after its submission.

PREREQUISITE: Final-year Honours candidacy.

Day Division: Annually (tutorial hours arranged).

Members of the Department

GRADUATE SEMINARS

SOCIOLOGY 500. *Sociological Theory*

Analysis of selected problems from the standpoint of systematic sociological theory.

Not offered, 1961-62.

SOCIOLOGY 510. *Political Sociology*

An examination of the sociological dimensions of power, politics, and political behaviour.

Evening Division: 1961-62.

Members of the Department

SOCIOLOGY 520. *Comparative Social Systems*

Comparative analysis of selected features of Canadian, British, and American social structure.

Not offered, 1961-62.

SPANISH

Lecturer Jeremy C. Forster, M.A.

Special Lecturer Francisco Atienza, B.T., Lic.T., Lic.D., Ph.D.

Students wishing to major in Spanish or to combine Spanish with another subject for their major should consult the Department for guidance on courses and summer reading. Such students will normally be required to include Spanish 300 and 310 and at least one course from the range 390-399 in their degree program.

All students are encouraged to make the fullest use of the language laboratory facilities in their own time.

SPANISH 115. *First-year University Spanish*

A course designed to give a sound basic knowledge of the language. The fundamentals of grammar will be covered, with the emphasis on idiomatic, spoken Spanish. Reading in the second half of the course is designed to create fluency and confidence and to build up vocabulary. Tapes will be available for laboratory work.

A select group, chosen on merit early in the year, will move ahead faster and be required to cover more ground than the others. Further promotion to this group or demotion from it may be made throughout the year.

PREREQUISITE: None.

Day and Evening Divisions: Annually (lectures four hours a week).

Members of the Department

SPANISH 205. *Second-year University Spanish*

A course designed to consolidate and supplement knowledge of the language acquired in the first year, to teach the correct writing of Spanish, to give conversational practice, and to introduce aspects of Spanish culture through selected readings. This course is a requisite for all students majoring in Spanish.

PREREQUISITE: Spanish 115 or equivalent.

Day and Evening Divisions: Annually (lectures three hours a week).

Members of the Department

SPANISH 300. *The Civilization of Spain*

A survey of Spanish history and culture, with extensive readings from Spanish literature. This course is a requisite for students majoring in Spanish.

PREREQUISITE: Spanish 205 or permission of the Department.

Day or Evening Division: 1961-62 (meetings to be arranged).

Mr. Forster

SPANISH 310. *History of the Spanish Language*

A study of the origins and development of the Spanish language. This course is a requisite for students majoring in Spanish.

PREREQUISITE: Spanish 205 or permission of the Department.

Day or Evening Division: 1961-62 (meetings to be arranged).

Dr. Atienza

SPANISH 324. *Mediaeval Spanish Literature*

A survey of Castilian literature from the Poema de Mio Cid to the period of the Catholic Kings.

PREREQUISITE: Spanish 205 or permission of the Department.

Not offered, 1961-62.

SPANISH 330.[335]. *The Poetry and Drama of the Golden Age*

Lectures on selected poets and dramatists of the Golden Age, with group readings and discussion. Performances from the Spanish classical theatre will be available on tape.

PREREQUISITE: Spanish 205 or permission of the Department.

Not offered, 1961-62.

SPANISH 336. *Modern Spanish Poetry*

Lectures on selected Spanish poets of the nineteenth and twentieth centuries. Group readings and discussion.

PREREQUISITE: Spanish 205 or permission of the Department.

Not offered, 1961-62.

SPANISH 338. *Federico García Lorca*

A study of Lorca's work and his significance in Spanish literature.

PREREQUISITE: Spanish 205 or permission of the Department.

Day or Evening Division: 1961-62 (meetings to be arranged).

Mr. Forster

SPANISH 341. *Don Quixote*

Reading and examination of Cervantes' classic. Cervantes' life and some modern interpretations of the theme of *Don Quixote* will be subjects for further study.

PREREQUISITE: Spanish 205 or permission of the Department.

Not offered, 1961-62.

SPANISH 344. *The Modern Spanish Novel*

Lectures on selected Spanish novelists of the nineteenth and twentieth centuries. Group readings and discussion.

PREREQUISITE: Spanish 205 or permission of the Department.

Not offered, 1961-62.

SPANISH 350. *The Civilization of Spanish America*

An introduction to the history and culture of Spanish America, with reading of selected authors.

PREREQUISITE: Spanish 205 or permission of the Department.

Not offered, 1961-62.

SPANISH 385. *Unamuro and Existentialism in Spain*

A study of the works and thought of Miguel de Unamuno and his influence on modern Spanish literature.

PREREQUISITE: Spanish 205 or permission of the Department.

Day or Evening Division: 1961-62 (meetings to be arranged).

Dr. Atienza

SPANISH 390-399.

Courses in this range are designed for students majoring in Spanish. They are to be taken only after completion of at least two 300 level courses with satisfactory grades, and will be arranged in collaboration with the Department. Specialized literary, historical or linguistic subjects will be selected on the advice of the Department for individual study and research on a tutorial basis. Only one course in this range may be taken in any one year.

FINANCIAL AID FOR STUDENTS

Scholarships, Prizes, Bursaries, and Loans

FINANCIAL AID FOR STUDENTS

SCHOLARSHIPS, PRIZES, BURSARIES, AND LOANS

1. The University welcomes the offer of scholarships, prizes, medals, and bursaries. The Registrar will be glad to send, on request, information as to the functions of scholarships and bursaries, and also a statement of particular needs at present in the financial aid program of the University.
2. Scholarships, prizes, medals, bursaries, and loan funds may be accepted from donors at the discretion of Senate on appropriate recommendation of the President. Awards of scholarships, prizes, and medals will be made by Senate to qualified candidates of merit; but the Senate may withhold any such award if no candidates of merit present themselves. The award of scholarships, prizes, and medals shall be final when formally announced by the University.
3. The standing of students being considered for any such awards shall be determined on the basis of courses taken for credit and shall not take account of extra courses being taken for no credit.
4. (a) No limitation shall be placed upon the number of prizes and medals which any one student may win in any one year. (b) A student may be declared the winner of as many scholarships as he may win as a qualified candidate of merit but, in the case of awards carrying a major financial amount, such student will normally receive the proceeds only of the largest among these major amounts. (c) Winners of scholarships and prizes may resign the monetary value but retain the honour of such awards, and their names will be published as winners. In cases arising under 4(b) or 4(c), the monetary amounts so relinquished may be awarded *by reversion* if merited.
5. A scholarship application will not be considered if the candidate has also applied for entrance scholarships at other universities.
6. Scholars who hold continuing scholarships at Carleton University must maintain a level of academic performance each year satisfactory to the Scholarships Committee, or relinquish their scholarships.
7. Undergraduate scholarships and bursaries of \$200 or more which are under the jurisdiction of the University will ordinarily be paid in two instalments, one in October and one in January. The University reserves the right to withhold the payment of the second instalment if the attendance or conduct of the student is not satisfactory. Awards of less than \$200 will ordinarily be paid in one instalment, in October.
8. The University does not guarantee the award of any scholarship, prize, medal, or bursary other than those created from funds of the University. Those awards based upon gifts of individuals or associations other than the University will be forwarded only after the funds required have actually been received from the donors.

SCHOLARSHIPS

I. UNDERGRADUATE SCHOLARSHIPS TENABLE AT CARLETON UNIVERSITY

Henry Marshall Tory Scholarships

Two entrance scholarships, of a total maximum value of \$2000 each (\$500 a year for a maximum of four years) have been established by the University, for open competition among students entering Carleton University at either senior or junior matriculation level.

Application for these Henry Marshall Tory scholarships must be made to the Registrar, Carleton University, not later than May 15 each year, on forms available from the University.

Established 1961, and named to commemorate the first president of Carleton University, Dr. Henry Marshall Tory.

University Entrance Scholarships

Four entrance scholarships, of a total maximum value of \$1200 each (\$300 a year for a maximum of four years) have been established by the University for competition among students entering the First year of Arts, Journalism, Commerce, Science, or Engineering from the following collegiate institutes or high schools of the city of Ottawa: Lisgar, Glebe, Fisher Park, Nepean, Technical, Laurentian, and Rideau, as well as from the secondary schools of ten Ontario counties adjacent to the city.

These four University Entrance scholarships, together with the four Mercy Neal Southam Entrance scholarships (described immediately below) will constitute each year eight scholarship awards to be granted on the following basis: one scholarship to the applicant with highest standing from each of the seven Ottawa schools cited, and one other scholarship to be available for competition among able students from the secondary schools of Renfrew, Prescott, Glengarry, Stormont, Dundas, Grenville, and Leeds. The order of award among the schools will be on merit; and in the case of any school where it happens in a given year that none of the candidates nominated qualifies, the University reserves the right to allot the scholarship elsewhere.

Candidates from the secondary schools must write at least *six* Ontario Grade XIII final examination papers in the year of application and will be judged on their *eight* best papers.

Scholarship applications must be submitted to the Registrar, Carleton University, not later than May 15 each year, on forms available from the University.

Mercy Neal Southam Entrance Scholarships

Four \$500 scholarships will be awarded annually, if merited, to students entering the First year of Arts, Journalism, Commerce, Science, or Engineering at Carleton University.

The conditions of award and administration of the Mercy Neal Southam Entrance scholarships will be the same as those governing the University Entrance Scholarships (described immediately above) except that each scholarship will be payable in two successive annual instalments of \$250, subject to scholarly performance.

Established in 1949 under the terms of bequest of the late Wilson Mills Southam, the scholarships are in memory of his grandmother, Mercy Neal Southam.

Union Carbide Canada Ltd. Undergraduate Scholarships

Tenable for four years, each Union Carbide scholarship has a maximum value of \$2500, payable \$700 the first year and \$600 in each subsequent year. Should the academic course be of less than four years duration, the scholarship will terminate with graduation. It may also be terminated at any time if the student fails to meet the requirements of the University. Two Union Carbide scholars are maintained in attendance at Carleton University.

Awarded to male graduates of secondary schools who (1) have good scholastic standing and personal reputation and are recommended by their school authorities; (2) will be enrolling in an Engineering, Physical Sciences, Commerce or Business Administration course, with a view to entering business, industry or the field of education upon graduation; (3) possess superior talent and ability (financial need is important but not paramount); (4) do not receive scholarship awards from other sources exceeding \$200 in one year.

Further information and appropriate application forms may be obtained from the Registrar.

Donor: Union Carbide Canada Limited. Established 1954.

The Ottawa Citizen Scholarship

A scholarship valued at \$900 will be awarded annually, if merited, to a student entering Carleton University from a high school in any one of the following counties in the Ottawa district: nine in Ontario — Carleton, Dundas, Glengarry, Grenville, Lanark, Prescott, Renfrew, Russell and Stormont — and four in Quebec — Gatineau, Hull, Papineau and Pontiac.

Candidates with junior or senior matriculation may apply for admission to Qualifying University or First year of Arts, Commerce, Journalism or Science.

Candidates with senior matriculation may apply for admission to Engineering.

A student admitted with junior matriculation standing will receive \$225 per year for a period of four years; a student admitted with senior matriculation standing will receive \$300 per year for a period of three

years; always provided that, in both cases, the student is registered as a regular full-time student of Carleton University and maintains a satisfactory academic standing.

A candidate for this scholarship must present evidence of high scholastic attainment, together with a record of outstanding participation in the extra-curricular activities of his school.

Applications are to be addressed to: the Registrar, Carleton University, Ottawa, by May 15.

Donor: The Ottawa Citizen. Established 1955.

Ottawa Business and Professional Women's Club Scholarship

Value \$200. Awarded annually to a girl entering Carleton University with high matriculation standing from one of the Ottawa collegiates and high schools. Donor: Ottawa Business and Professional Women's Club. Established 1946.

School of Public Administration Scholarship

Value \$500. Awarded, preferably to a public servant, for full-time study toward the Certificate in Public Service Studies. For details regarding application, see p. 177.

Regional Entrance Scholarships

Value \$1600 each. Four are awarded annually, if merited, on the basis of outstanding achievement in secondary school studies, to students entering Carleton University with junior or senior matriculation standing on the following distribution:

(a) Two scholarships available for Ontario (except the city of Ottawa), and the Western Provinces and Territories.

(b) Two scholarships available for Quebec Province and the Maritime Provinces.

Each scholarship winner will have \$400 applied to the cost of tuition at the time of registration in his first year at Carleton University, and, if he is still in attendance and making progress satisfactory to the Scholarships Committee, \$400 at the time of registration in each succeeding year, not exceeding four years in all.

Scholarship applications, accompanied by a formal application for admission to course and supported by a letter of recommendation from the high school principal, must be submitted to the Registrar, Carleton University, not later than June 15, on forms available from the University.

These scholarships were established by the University in 1952.

International Nickel Company Scholarship

One entrance scholarship has been established by The International Nickel Company of Canada, Limited, restricted to study in the fields of

engineering, geology, geophysics, mathematics and physics. The scholarship covers tuition fees, a grant of \$300.00 to the student, as well as a cost-of-education supplement of \$500.00 to the University. The maximum award for a scholarship is \$1,200.00. Any graduate of a high school or the equivalent, or any student in his final high school year, who has good scholastic standing and personal reputation, is eligible to apply. It is awarded by the University Scholarships Committee on the basis of the applicant's record, character, and financial need. The scholarship is renewable annually to the student for a maximum of three additional academic years or, in certain cases, until graduation, whichever is the shorter period. Further details from the Registrar.

Donor: The International Nickel Company of Canada, Limited. Established 1956.

W. Sparks & Son Ltd., Entrance Scholarship

Value \$500.00. Awarded annually to an entering student of superior scholarship who is the child of a Canadian Government employee serving outside Canada; or who has served overseas immediately prior to the application of his child, or who will be serving overseas in the future immediately following such application.

Donor: W. Sparks & Son Ltd., Ottawa. Established 1960.

E. B. Eddy Company Continuing Scholarships

Two scholarships each of value \$600 a year until graduation. Each scholarship is open to a graduate, preferably male, of a Canadian secondary school, who has high scholastic standing in his senior matriculation examinations. Each scholarship is awarded by the University and retained, if merited, until graduation, at which time the next E. B. Eddy Scholar will be named. New scholars will be named in 1962 and 1963.

Donor: The E. B. Eddy Company. Established 1959.

Parfield Oils Ltd., Scholarships

Three scholarships, of total value \$1200 annually, have been established by Parfield Oils (1952) Limited for competition among students entering Carleton University or undergraduates of the University. In addition, a sustaining fund of \$800 annually has been provided to help defray the cost to the University of educating the winning scholars.

The scholarship awards are:

1. One entrance scholarship of value \$600 to be awarded annually, if merited, to a student entering Carleton University with high standing in the senior matriculation examinations. The application for this

scholarship, accompanied by a letter of recommendation from the candidate's high school, is to be submitted to the Registrar of Carleton University not later than July 1 on forms available from the University.

2. Two scholarships of value \$300 each, to be awarded annually to an outstanding student progressing from one year of course to another in Carleton University.

Donor: Parfield Oils (1952) Limited, Ottawa, Canada. Established 1959.

Association of Professional Engineers' Entrance Scholarships

(1) Value \$500. Awarded annually to a Grade XIII student of high proficiency who is entering the engineering course.

(2) Value \$250. Awarded annually to an engineering student of high proficiency proceeding from one year of course to another in Carleton University.

Donor: The Ontario Professional Engineers' Foundation for Education. Established 1961.

James H. Rattray Memorial Scholarships

Value \$200 each. Two scholarships awarded annually to a student entering first year Engineering at Carleton University.

Donor: The late James H. Rattray, M.C. Established 1961.

Carleton Alumni Association Scholarships

Eight scholarships, of value \$500 each, have been provided for 1961-62 for undergraduates passing from one year of course to another at Carleton University with high standing. Certain of the scholarships are reserved for students in honours.

Donor: The Carleton University Alumni Association.

Maxwell MacOdrum Scholarships

Three scholarships, of a value of \$400 each, have been provided by the University for annual competition among undergraduates in the various disciplines. Each scholarship will be awarded on a basis of outstanding performance, and will be retainable for one year.

The scholarships are named in memory of Dr. Maxwell MacOdrum, second president of Carleton University. Established 1961.

Lord Dundonald Chapter (I.O.D.E.) Scholarship

Value \$100. Awarded annually to a student of superior standing and general proficiency, entering the final year of a degree course at Carleton University.

Donor: Lord Dundonald Chapter, I.O.D.E. Established 1956.

Ottawa Women's Canadian Club War Memorial Scholarship

Value approximately \$100.00. Awarded annually to a student progressing from Qualifying University year to First year in Carleton University. Preference is given to veterans or their children. Endowed 1946.

Clendinnen Scholarship in Biology

Value \$100. Awarded annually to an outstanding student proceeding from the Third to the Fourth year of the honours course in biology at Carleton University. Established 1951, in memory of Mr. and Mrs. T. E. Clendinnen, by their daughter.

Canadian Club of Ottawa Scholarship

Value \$200. To foster interest in public affairs, Canadian citizenship and Canadian history, this award is presented annually to a student entering the final year of a degree course who has shown outstanding promise in studies and work relating to national development in Arts and Letters, Humanities and the Social Sciences. Donor: The Canadian Club of Ottawa. Established 1952.

Gavin Scott Macfarlane Memorial Scholarship

Value \$200. To be awarded in 1961-62 to an outstanding student, preferably in honours, who is proceeding from one year of course to another in Carleton University.

First donated 1957, by Mrs. G. S. Macfarlane in memory of her husband, Lieutenant-Colonel Gavin Scott Macfarlane.

Ottawa Woman's Club Scholarship

Value \$100. Awarded annually to an outstanding student progressing from one year of course to another in Carleton University, preference to be given to women students. Donor: The Ottawa Woman's Club. Established 1952.

University Women's Club of Ottawa Scholarship

Value \$100. Awarded annually to a deserving student progressing from one year of course to another, preference to be given to a woman student where other qualifications are equal. Established 1952, in honour of Dr. Alice E. Wilson, by The University Women's Club of Ottawa.

N.F.C.U.S. Interregional Study Exchange Plan

Since 1952, Carleton University has participated in the Interregional Study Exchange Plan sponsored by the National Federation of Canadian University Students.

Each year, six students from universities other than English-language institutions of Ontario and Quebec may be granted free tuition at Carleton for the studies of their penultimate year. Two Carleton students may be chosen from among those who apply for permission to study, tuition free, at French-language universities in Quebec, or universities of the west coast, the prairies or the Maritimes.

Carleton students wishing to apply for participation in the plan should consult the Registrar before January 31. Selection will be made by a committee composed of the Dean of the Faculty of Arts and Science, the Registrar, the President of the Students' Council, and the External Affairs Chairman of the Students' Council. All applications will be subject to the approval of the host university.

Jean MacOdrum Memorial Scholarship (Hleodor Society)

Value \$100. Awarded annually, if merited, to a woman who is a full-time undergraduate proceeding to the final year of a degree course, who has a better than average academic record, and who has shown participation and leadership in extracurricular activities.

Each candidate is nominated by at least three students and selection is made by a committee of the Hleodor Society composed of a first-year student, a second-year student, a final-year student, at least one member of the executive of the Hleodor Society, the Registrar, and a member of Faculty. Nominations must be forwarded to the Registrar not later than February 15.

Established 1953, in memory of Mrs. M. M. MacOdrum, by the Hleodor Society of Carleton University.

Jean Feltrin Memorial Scholarship (Hleodor Society)

Value \$100. Awarded annually, if merited, to a woman student proceeding to the final year of the honours course at Carleton, or entering graduate work here following graduation in the bachelor's course.

Established 1961, by the Hleodor Society of Carleton University, in memory of Jean Feltrin, a special student of the University in 1954-55, who gallantly endeavoured to carry on studies while almost totally immobilized as a post-poliomyelitis patient.

J. P. Bickell Foundation Scholarships

The Trustees of the J. P. Bickell Foundation have established in the Department of Geology, Faculty of Arts and Science, scholarships for students entering the Geological profession, of a possible value of \$1,200 each. The Scholarships may be awarded on entrance into the Honours Geological sequence at the First, Second or Third year levels at Carleton University. The scholarships are payable over two or three years depending on the entrance level.

Application must be made to the Chairman of the Department of Geology by May 15. In order to be eligible, the applicant must undertake to register in the Honours Geology sequence with a minor in Biology, Chemistry, Mathematics, or Physics; or a combined Honours sequence of Geology and one of the above-mentioned subjects.

Full particulars and application forms may be obtained from the Registrar of the University.

Regent Vending Machines Ltd., Scholarships

Two scholarships of value \$100 each. One scholarship is awarded annually to an outstanding student in Engineering proceeding from the first to the second year in the Engineering curriculum; and the second scholarship to such a student proceeding from the second to the third year of that curriculum. Donor: Regent Vending Machines, Limited. Established 1954.

Ottawa Valley Aquarium Society Scholarship

Value \$50. Awarded annually to an outstanding student proceeding from the Second to Third year of the major course in Biology at Carleton University.

Donor: Ottawa Valley Aquarium Society. Established 1960.

Riddell, Stead, Graham and Hutchison Award

This award is given to a student who is completing his pre-graduating year, is proceeding to his graduating year and who intends upon graduation to train with a practising firm of chartered accountants. The form of the award is the payment of the student's tuition fees for his final undergraduate year at Carleton. The award will be made to the student whose personality, ability, academic record and other characteristics are, in the opinion of the Committee on Commerce Studies, those needed by a Chartered Accountant. Applications should be submitted to the Chairman of the Committee on Commerce Studies before March 1.

Government of Ontario Scholarships

The Government of Ontario has, for the academic year 1961-62, greatly expanded its student-aid program by appropriating the sum of \$1,200,000 to that end and by authorizing the use of a portion of that sum for the award of a number of Ontario Scholarships to students who show outstanding ability as evidenced by their results on the annual Grade XIII Departmental examinations.

Ontario Scholarships of the value of \$400 may be awarded to applicants who obtain an average of not less than 80 per cent on eight papers of the Grade XIII Departmental examinations (including both papers in English), all written in the year of application, and who enrol in an eligible institution in September, 1961. Scholarship announcement and application forms have been sent to the schools.

The Duchess of Connaught Scholarship

The yield from the endowment of this historic scholarship, amounting to approximately \$350 annually, has been made available to Carleton University by the Laurentian Chapter, I.O.D.E. The scholarship is to be awarded to an able student entering Carleton University, and may be

held until graduation, if merited; at which time a new award will be made.

Donor: Laurentian Chapter, I.O.D.E. Established at Carleton University, 1960.

Commonwealth Scholarships

Under a Plan drawn up at a conference held in Oxford in 1959, each participating country of the Commonwealth offers a number of scholarships to students of other Commonwealth countries. These scholarships are mainly for graduate study and are tenable in the country making the offer. Awards are normally for two years and cover travelling, tuition fees, other university fees, and a living allowance.

For details of the awards offered by the various countries consult the Registrar of Carleton University or write to The Canadian Universities Foundation, 77 Metcalfe Street, Ottawa. Persons doing so are advised to inquire not later than October 11 in 1961, if planning to apply for the year 1962-63.

II. POST-GRADUATE AWARDS TENABLE AT CARLETON UNIVERSITY:

GENERAL:

Carleton University offers annually a number of Fellowships of value \$2000. These Fellowships carry with them limited teaching duties; they do not include remission of fees. Bursary and loan funds are also available for graduate students.

Applications for the Fellowships must be received by March 1.

PUBLIC ADMINISTRATION:

The following awards are available for study in the academic year 1961-62:

1. For full-time study for the Master of Arts degree or the Diploma in Public Administration:
 - (a) one scholarship of \$1500;
 - (b) two scholarships of \$1000 each;
 - (c) two scholarships of \$750 each.
2. For part-time study toward the M.A. or Diploma in Public Administration — ten scholarships, each equivalent to the tuition fee for the current year.

Providing that there are fully qualified applicants presently employed in the Public Service of Canada, one or more of the scholarships for full-time study will be awarded to public servants. They could then apply to their departments for educational leave with partial pay.

Applications for awards for full-time study must be received by April 1, and for part-time study by May 1. Announcement of the awards will be made shortly thereafter. Application may also be made,

up to August 31, for awards not granted or taken up in April or May. A full-time Fellow or Scholar may in addition apply, at any time, for a loan of up to \$1,500 or for a bursary. The required forms may be obtained from the Registrar.

Reader's Digest Fellowships in Journalism

Two fellowships of \$500 each are available to graduates in Arts who have good standing in other academic subjects and who have concentrated especially in English, History, Psychology and one or more of the social sciences. Experience in practical journalism in any medium should be reported and will be taken into account. All the material relevant to the application, including information on past experience in newspaper, magazine, radio, TV or other fields of journalism or writing, together with letters of reference from newspaper editors, must be in the hands of the Registrar, Carleton University, by July 15 of the year in which the fellowship is awarded.

Donor: Reader's Digest Association (Canada) Limited. Established 1961.

British West Indies Scholarship

Value \$500. Open to residents of the British West Indies and British Guiana who wish to work toward the degree of M.A. or M.Sc. at Carleton University.

The scholarship is renewable for one year provided the holder is successful in completing his first year satisfactorily, and that he requires the second year to complete his degree program. Candidates must be able to meet the admission requirements of the School of Graduate Studies.

Candidates must hold the Bachelor's degree with second class standing.

Academic merit will be the chief basis of award, but financial need will be taken into account.

Candidates must apply to the Registrar, Carleton University, by June 15. The application should include a curriculum vitae, three letters of reference, an indication of financial need, if any, and a statement of the graduate field.

III. POST-GRADUATE SCHOLARSHIPS TENABLE ELSEWHERE

Students are invited to watch the University bulletin board for notices of scholarships, and to consult the Registrar who has a number of publications outlining fellowships and scholarships available for study in the various universities in Canada and abroad.

PRIZES

B'nai B'rith Awards

Two of \$50 each, awarded annually to students with superior academic records, progressing from one course-year to another in Carleton University. Donor: B'nai B'rith, Ottawa Lodge No. 885. Established 1947.

Faculty Club Prize

Value \$25. Awarded by the Faculty Club of Carleton University to a student chosen by the President. Established 1946.

National Council of Jewish Women Award

Value \$100. Awarded on the recommendation of the Department of History to the student achieving the best standing in Canadian History. Donor: National Council of Jewish Women, Ottawa Section. Established 1950.

Lilian I. Found Prize for Poetry

Value \$25. Offered annually for the best lyric of fifty lines or less submitted by an undergraduate of Carleton University by March 15. Details may be obtained from the Registrar's office. Donor: Mrs. Lilian I. Found. Endowed 1950.

Chemical Institute of Canada Prize

Value \$25. Awarded as a book prize to the best student proceeding to the final year of the course leading to the degree of Bachelor of Science with honours in Chemistry. Donor: The Chemical Institute of Canada. Established 1950.

Engineering Institute of Canada Prizes

For proficiency in engineering studies, a prize of \$35 is awarded to a student completing second-year Engineering, and a book prize of the value of \$15 is awarded to a student completing first-year Engineering. Donor: Ottawa Branch, Engineering Institute of Canada. Established 1947.

D. F. McKechnie Prize in Accounting

The yield of a \$200 fund is used each year to purchase a book prize to be awarded, when merited, to a student in Commerce for proficiency in the study of accounting. Donor: D. F. McKechnie, C.P.A. Endowed 1951.

Prize of the Seniorettes of the National Council of Jewish Women, Ottawa Section

Value \$50. Awarded annually, if merited, on the recommendation of the Department of Psychology, to a Second year woman student majoring in Psychology, who is judged to be the most promising in this field. Donor: The Seniorettes of National Council of Jewish Women. Established 1956.

American Society for Metals Prize in Engineering

Value \$25. Awarded annually to a student with high standing in the first year of the Engineering course. Donor: Ottawa Valley Chapter, American Society for Metals. Established 1951.

Henry Birks and Sons (Ontario) Ltd., Award

Value \$25. Awarded annually to a Carleton University student with a superior academic record who has contributed substantially to extra-curricular activities. Donor: Henry Birks and Sons (Ontario) Ltd. Established 1951.

Wilgar Memorial Prize in English

The yield of a \$200 fund is used each year for a book prize to be awarded to a Carleton University undergraduate who has shown excellence in essay-writing. Established 1951, in memory of the late W. P. Wilgar, Assistant Professor of English at Carleton University, 1948-50. Endowed 1952.

Henry Marshall Tory Award

Presented annually to an outstanding graduating student who has shown a high degree of academic application, has indicated an interest in the University by broad participation in extracurricular activities of a constructive nature, has indicated qualities of leadership, and has attended Carleton University for at least three winter sessions.

Each candidate is nominated by at least five members of the Students' Association and selection is made by a committee composed of the President of the University, a member of the Board of Governors, the Registrar, a member of the Faculty Board, and three students chosen by the Students' Council.

The Winner's name is inscribed on the master trophy and he receives a miniature replica.

The award was established in 1950 by the Students' Council of Carleton University.

H. Carl Goldenberg Book Prize

Value \$10. Awarded annually as a book prize for excellence in Journalism subjects taken in the Second year of the Bachelor of Journalism Course. Donor: H. Carl Goldenberg, O.B.E., Q.C., of Montreal. Established 1953.

Kenneth R. Wilson Memorial Award for Journalism Graduates

Value about \$200. Offered annually to a student graduating in Journalism who, in the opinion of a board of selection, shows exceptional promise as a future reporter and interpreter of Canadian affairs. Endowed 1953, in memory of Kenneth R. Wilson, Ottawa Editor of The Financial Post, by a group of his personal friends.

Catherine Daumery Memorial Prize for Botanical Collection

Value \$35, together with a book prize. Awarded annually, if merited, on the recommendation of the Department of Biology, to a student who has submitted, by November 1, an outstanding collection of mounted and identified flowering plants. Donor: Anonymous. Established 1953.

Elizabeth White Memorial Prize for Zoological Collection

Value \$35, together with a book prize. Awarded annually, if merited, on the recommendation of the Department of Biology, to a student who has submitted, by November 1, an outstanding collection of insects or arachnids, properly preserved and identified. Donor: Anonymous. Established 1953.

The Ottawa South Branch (W.C.T.U.) Prize in Sociology

Value \$50. To be awarded in 1961, if merited, to a student of Carleton University chosen by the Department of Sociology for excellence in the study of Sociology. Donor: The Ottawa South Branch of the Women's Christian Temperance Union.

Donald Lawrence Moulds Memorial Prize in English

Value \$50. Awarded annually, if merited, on the recommendation of the Department of English Language and Literature, to an outstanding student proceeding beyond the First year of the pass or honours course in English. Established 1954 by Ernest Moulds, in memory of his son who was killed in action while serving as a Spitfire pilot in the R.C.A.F. overseas in World War II, 1942.

Alan Larocque Prize in Mathematics

Value \$15. Awarded annually as a book prize to the highest ranking graduate in honours Mathematics. Donor: Alan Larocque, B.Sc., an honours graduate in Mathematics of Carleton University. Established 1956.

The Dr. M. Ralph Berke Prize in Chemistry

The yield of a \$500 fund is awarded each year, if merited, on the recommendation of the Department of Chemistry for a prize to be awarded to an outstanding student majoring in Chemistry proceeding from the Second to the Third year of the degree course.

Donor: Dr. M. Ralph Berke. Established 1956.

American Society H.A.C.E. Prizes

Value \$100, to be awarded in 1960-61 as follows: one first prize of \$75 for the best Summer Essay; one second prize of \$25 for the Summer Essay.

Donor: American Society of Heating and Air Conditioning Engineers, Ottawa Valley Chapter. Established 1958.

The Ann Smith Freedman Memorial Prize

Value \$50. Awarded to the student in Psychology who has gained the highest standing in the experimental paper in Psychology 305 during the academic year. Donor: Mr. and Mrs. Jarvis Freedman. Established 1958.

Prize of the Canadian Institute of Mining and Metallurgy (Ottawa Branch)

Value \$25. To be awarded to a worthy student completing his second year at Carleton University and registered in one of the branches of the mineral industry; the student to have attained at least high second class honours; the selection to be made by the Director of the School of Engineering and the Chairman of the Department of Geology, jointly. Established 1956.

International Nickel Co. of Canada Ltd. Award in Journalism

For the year 1961-62, for the graduating student in Journalism with the best record in the Journalism subjects, a plaque and the prize of a portable typewriter is provided by the International Nickel Company of Canada, Limited. Established 1960.

Wild of Canada Ltd., Prize in Engineering

A prize of a set of stainless steel drawing instruments is awarded annually to a student in first year Engineering at Carleton University judged most worthy of the award by the School of Engineering.

Donor: Wild of Canada Limited. Established 1960.

De Waan Foundation Prize on Arab Problems

Each year for a period of five years from the first year of award, the De Waan Foundation offers a prize for work of appropriate scholarly level by an upper class student on the problems of Arab countries. Annual value, \$100. Students wishing to prepare for this award should first consult the Director of the School of Public Administration.

Donor: De Waan Foundation, 1960.

Encyclopaedia Britannica of Canada Ltd. Prizes

A set of the Great Books of the Western World has been made available annually for a graduating student in science, and also a graduating student in engineering, with the best record of scholastic achievement in the other areas which are generally recognized as comprising a liberal education.

Donor: Encyclopaedia Britannica of Canada Limited. Established 1961.

Frances Oakes Baldwin Prize in Journalism

Value \$150. Awarded to the undergraduate with the best record in

the Second year Journalism degree program during the academic term 1961-62.

Donor: Mrs. Frances Oakes Baldwin. In memory of the pioneers of the Kincaid district, Saskatchewan. First awarded, 1959.

Prize of the Ambassador of Switzerland to Canada

For excellence in the study of French, a book prize is offered annually by the Ambassador of Switzerland to Canada. Established 1953.

French Embassy Awards

French Embassy Book Prize, for excellence in the study of French, a book prize is presented by the French Embassy in Canada. Established 1953.

French Embassy Medal, awarded, if merited, to a graduating student for excellence in French. Established 1955.

Prize of the Embassy of the Federal Republic of Germany

For excellence in the study of German, a book prize is offered annually by the Embassy of the Federal Republic of Germany in Canada. Established 1955.

Prize of the Embassy of Austria

For excellence in the study of German, a book prize is offered annually by the Austrian Embassy in Canada. Established 1960.

Spanish Embassy Prize

For excellence in the study of Spanish, a book prize is offered annually by the Spanish Embassy in Canada. Established 1960.

MEDALS

The Governor-General's Medal

Awarded annually, provided first class standing is obtained, to the student standing at the head of the graduating class. Donor: His Excellency the Governor-General of Canada. Established 1952.

University Medals

Awarded annually, when merited, to the graduating students standing highest in Arts, Science, Commerce, Journalism, and Engineering. Established 1949.

Senate Medals

Awarded, when merited, to graduating students of outstanding academic achievement. Established 1952.

Medal in Engineering (Ontario Association of Professional Engineers)

Awarded annually, when merited, to the graduating student standing highest in Engineering. Established 1961.

BURSARIES

Applications for Dominion-Provincial Student-Aid Bursaries, Type A, for Atkinson Charitable Foundation Entrance Bursaries, and for Rotary Club and Lions Club Awards (for students entering university from secondary school) should be made through secondary school principals. Applications for Dominion-Provincial Student-Aid Bursaries, Type B (for students progressing from one year to another in university) should be made through the Registrar of Carleton University after the commencement of fall classes.

Applications for all other bursaries listed below should be made to the Registrar not later than August 31.

University General Bursary Fund

A sum of \$6800 is available in 1961-62 to provide bursaries in aid of students with satisfactory academic standing who, in the first or subsequent course-years, are in need of financial assistance. Established by the University in 1954.

Graduate Bursary Fund

The sum of \$1,000 is available in 1961-62 to provide bursaries for graduate students with appropriate academic standing who are in need of financial assistance. Established by the University, 1958.

Provincial and Dominion-Provincial Student-Aid Bursaries

Value up to \$500 each and tenable at the various colleges and universities of Canada, including Carleton University. They are awarded to "students of good character, whose health and physical fitness are satisfactory, who meet the required academic standing, and who, without financial assistance, could not continue their formal education."

Candidates must be residents of Ontario and have obtained at least second-class standing in the examinations of the year prior to that for which the bursary would be used.

Charles Ogilvy Ltd., Bursary Fund

Value \$1000. To provide bursaries for students with good academic standing and who are in need of financial assistance.

Donor: Charles Ogilvy Limited. Established 1960.

ATA Trucking Industry Educational Foundation, Bursary Fund

Value \$1,200. To provide bursaries for First or Second year students who, due to extenuating circumstances, are deserving of financial assistance, and without such assistance would be unable to continue their studies.

Donor: Automotive Transport Association of Ontario (Inc.) Established 1959.

Rotary Club of Ottawa Awards*Entrance Awards*

Value up to \$400 each, awarded annually, on the basis of scholarship and financial need, to students from Ottawa schools entering a college or university. One or more of these may be held at Carleton University.

Continuation Awards

Available to students who are residents of Ottawa, have completed successfully at least one year at the University, and have been nominated by the University authorities on the basis of ability and need.

Lions Club of Ottawa Awards

Value up to \$400 each. Awarded annually to Ottawa students who, without financial assistance, could not continue their formal education. These may be held at Carleton University.

Kinsmen Club of Ottawa Awards

Value up to \$500 each. Awarded annually to Ottawa senior high school boys who, without financial assistance, could not continue their formal education. Certain of these may be held at Carleton University.

Ottawa Superfluity Shop Bursaries

An annual sum of approximately \$180 is available to provide bursaries for veterans of World War I or World War II, or for the descendants of such veterans, who are students in good standing at Carleton University and in need of financial assistance. Endowed 1947.

Ottawa Citizens' War Services Committee Bursary

An annual sum of approximately \$60 is available to assist veterans, their dependents or descendants, who are students in good standing at Carleton University and are in need of financial assistance. Endowed 1948.

Gyro Club Bursaries

Two bursaries of \$250 each. Awarded annually to male students of promise who have completed at least one academic year at Carleton University, who have specific professional or vocational goals, and who, without financial assistance, could not continue their formal education. Donor: Gyro Club of Ottawa. Established 1949.

Wild of Canada Ltd. Bursary

Value \$250. Awarded annually to a student majoring in Biology, with good academic standing and who is in need of financial assistance. Donor: Wild of Canada Limited. Established 1961.

Quota Club Bursary Fund

The sum of \$200 is available for the year 1961-62 to aid women students in good standing who are in need of financial assistance. Donor: Quota Club of Ottawa. Established 1950.

J. P. Bickell Foundation Bursary Fund

Value to be announced. The Trustees of the J. P. Bickell Foundation have established bursaries in the Faculty of Arts and Sciences. An applicant must be taking a normal sequence of courses leading to a degree in Geology and must have competent academic standing. Carleton students may obtain full details of the Bursary from the Student Personnel Officer (Office of Registrar). Donor: J. P. Bickell Foundation, Toronto. Established 1956.

Loyal Order of Moose Bursary

Value \$200. To be awarded to an entering student of good academic standing and in need of financial assistance. Donor: Ottawa Lodge No. 1765, Loyal Order of Moose. Established 1958.

Carleton University Faculty Bursary Fund

Provided annually by the Faculty to assist students of good academic standing who have completed one academic year in the University and who are in need of financial assistance. Established 1958.

Ottawa Business and Professional Women's Club Continuing Bursary

Value \$200. Awarded to a girl with competent standing in the Senior Matriculation examination, graduating from a collegiate institute or high school in Carleton County.

The bursary may be held until graduation, renewable annually, provided the student maintains satisfactory standing in her studies at Carleton.

Donor: Ottawa Business and Professional Women's Club. Established 1959.

Falkland Chapter (I.O.D.E.) Bursary

Value \$100. Awarded to a deserving student progressing from one year of course to another in Carleton University. Donor: Falkland Chapter, I.O.D.E. Established 1950.

Knights of Pythias, Aurora Lodge No. 53 Bursary

Value \$100. Awarded 1961-62 to a good student, progressing from one year of course to another, who needs financial assistance to continue his or her studies.

Donor: Knights of Pythias, Aurora Lodge No. 53. Established 1960.

Atkinson Charitable Foundation Bursary Fund

The sum of \$2,000 is available to assist students of Carleton University in the academic year 1961-62. Terms of award are as follows:

1. In addition to scholastic merit and financial need, goal and promise will be considered in selecting recipients.
2. Candidates must be residents of Ontario.
3. Applications may be for sums up to \$500.
4. An applicant must have completed at least one academic year and be enrolled as a full-time undergraduate in any course at Carleton University.
5. For one of the awards, preference will be given to candidates intending later to pursue studies in Theology.
6. Applications should be made on forms available from the Registrar's Office, not later than August 31, 1961.

Donor: The Atkinson Charitable Foundation. Offered for the first time in 1951, as an experiment in the provision of financial aid to students.

Atkinson Charitable Foundation Entrance Bursaries

Value: \$400 for students living away from home, \$200 for students residing within commuting distance of the university. Candidates must be residents of Ontario and in need of financial assistance. They must obtain an average of at least 66% on eight Ontario Grade XIII examination papers, be qualified for entry to the degree course of their choice, and be sponsored by their high school principals. Application should be made through the high school principal before May 1. Carleton University is one of the Ontario universities at which these bursaries may be held. Donor: The Atkinson Charitable Foundation, Toronto. Established 1953.

The Maurice Frederick Carty Bursary

Value \$300. To be awarded annually to a student in course who would not otherwise be able to proceed without delay to a higher year within the University. Donor: Mrs. E. G. Carty, in memory of her son, Maurice Frederick Carty. Established 1957.

Countess of Ashburnham Chapter (I.O.D.E.) Bursary

Value \$300. To be awarded annually to a student entering Carleton University, or already in course, who is in need of financial assistance to carry on full-time studies. Donor: The Countess of Ashburnham Chapter I.O.D.E. Established 1959.

Protestant Girls' Club of Canada Bursary

Value \$100. To be awarded annually to a Protestant girl or girls proceeding into the graduating year at Carleton University. Donor: The Protestant Girls' Club of Canada. Established 1955.

Arnhem Chapter (I.O.D.E.) Bursary

Value \$100. to be awarded in the academic year 1961-62 to a student with satisfactory academic standing who in the judgment of the President of Carleton University is in need and deserving of financial assistance. Donor: Arnhem Chapter I.O.D.E. Established 1955.

R. A. Beamish Bursary

Value: approximately \$250. Awarded annually to a student entering or progressing from one academic year to another who, without financial assistance, could not continue his or her formal education. To be eligible, an applicant must be a resident of one of the eleven eastern counties of Ontario (Renfrew, Frontenac, Lanark, Leeds, Carleton, Grenville, Russell, Dundas, Prescott, Glengarry, Stormont). Donor: The R. A. Beamish Foundation. Endowed 1951.

South Ottawa Kiwanis Club Bursaries

(1) Value \$250. Awarded annually to a student who has completed successfully at least one academic year in Carleton University and who, without financial assistance, could not continue college studies. Donor: Kiwanis Club of South Ottawa. Established 1951.

(2) Value \$250. Awarded annually to a student who has completed successfully at least one academic year in Carleton University and who, without financial assistance, could not continue college studies. Restricted to students from Ottawa and from areas outside the capital in Carleton and Russell Counties.

Donor: Kiwanis Club of South Ottawa. Established 1958.

South Ottawa Kiwanis Club (*Ladies Auxiliary*) Bursary

Value \$50. To be awarded in the academic year 1961-62 to a woman student who has completed one academic year at Carleton University, and who is in need of, and deserving of, assistance to continue studies as a full-time student. Donor: Kiwanis Club of South Ottawa (*Ladies Auxiliary*). Established 1956.

The South Ottawa Lions Club Bursaries

Two bursaries of value \$100 each, to be awarded annually to a student of good character, who exhibits proficiency and promise, and who has completed one academic year at the University, and who, without the benefit of financial assistance, would be unable to continue his or her chosen studies. Donor: South Ottawa Lions Club. Established 1957.

James H. Rattray Memorial Bursaries

Value \$200 each. Three bursaries for students in Science and Engineering, with certain areas of preference. (Candidates are invited to inquire about these from the Registrar's Office).

Donor: The late James H. Rattray, M.C. Established 1961.

Engineers' Wives Association Bursary

Value \$200. To be awarded annually to a deserving student enrolled in the First year of Engineering.

Donor: Engineers' Wives Association of Ottawa. Established 1959.

Earnscliffe Chapter (I.O.D.E.) Bursary

Value \$100. Awarded annually to students entering or progressing from one year of course to another in Carleton University, who have satisfactory academic standing and are in need of financial assistance.

Donor: Earnscliffe Chapter I.O.D.E. Established 1959.

Ottawa Poppy Welfare Fund University Award

The Ottawa Poppy Welfare Committee offers for 1961 an amount of Fifteen Hundred Dollars (\$1,500.00) to be used as awards to university entrance or to assist good students who are short of funds to continue in university. The amount of an award is Three Hundred Dollars (\$300.00) to any one student but this amount may be modified depending on financial circumstances.

Application forms are available at Poppy Fund Headquarters, Trafalgar House, or the Registrar's Office, Carleton University. Donor: The Ottawa Welfare Poppy Fund Committee. Established 1956.

National Memorial Chapter (I.O.D.E.) Entrance Bursary

Value \$100. To be awarded to a student entering Carleton University in 1961 who requires financial aid to begin the University course. Donor: National Memorial Chapter I.O.D.E.

Philemon Wright Chapter (I.O.D.E.) Bursary

Value \$75. Awarded annually to a student with satisfactory academic standing who is in need of financial assistance. Open only to residents of the Province of Quebec, with preference to those resident in the County of Hull and adjoining counties. Donor: Philemon Wright Chapter, I.O.D.E. Established 1952.

Lady Perley Chapter (I.O.D.E.) Bursary Fund

Value \$500. One bursary of \$250 to be awarded to an Arts student with good academic standing who is in need of financial assistance. One bursary of \$250 to be awarded to a Science student with good academic standing who is in need of financial assistance.

Donor: Lady Perley Chapter (I.O.D.E.). Established 1960.

C. A. Fitzsimmons and Company Ltd. Bursary

Value \$150. Awarded annually to a competent student entering Carleton University who, without financial assistance, could not continue his or her formal education. Donor: C. A. Fitzsimmons and Company Limited, Ottawa. Established 1960.

The Jury Bursary

Value \$150. Awarded to a student with good standing entering or continuing at Carleton University, who is in need of financial assistance. The bursary may be held until graduation, if merited.

Donor: Mr. and Mrs. John M. H. Jury. Established 1960.

Harry Wood and Company Bursary

Value \$150. Awarded annually to a deserving student in Commerce in need of financial assistance.

Donor: Harry Wood and Company. Established 1960.

Children of War Dead (*Education Assistance*) Act

This act provides fees and monthly allowances for children of veterans whose deaths were attributable to military service. Enquiries should be directed to the nearest District Office of the Department of Veterans Affairs.

LOAN FUNDS

The university administers several loan funds which are available for short and long term loans to students in need of financial aid.

Loans made from funds held in trust by the University are in general limited to \$250 a year for any one student, with a maximum of \$600 total to one student. They are repayable after termination of undergraduate studies, and bear interest at the rate of 4% per annum beginning January 1 following the termination of studies. To be eligible for a loan from one of these funds, a student must have a satisfactory academic record and be able to show that he could not continue his studies without financial assistance.

General Loan Fund. Unrestricted. In addition to loans made on the general basis outlined above, one-month loans of up to \$25 may be made from this fund. Applications will be received by the Student Personnel Officer in the Registrar's Office. Founded by Kenneth Brewster. Other donors: Women of Rotary, Office Staff of Carleton College, F. J. G. Cunningham, Katherine J. Milliken, Mrs. J. S. MacLean, the late Mrs. Lila Wilson, and several anonymous donors. Established 1948.

John W. Parker Loan Fund. To assist students in need of, and deserving of, financial assistance, who appear willing and able to repay their loans. Undergraduates will normally be expected to have completed at least one year at Carleton University. Applicants must present a passing grade and show evidence in their academic record of likelihood of graduation. Under normal circumstances, the maximum loan to a student shall be \$500 a year, but loans up to \$1,500 a year to students with dependents may be made, if merited. Donor: The late Mrs. John W. Parker. Established 1955.

Provincial Student-Aid Loans

Value up to \$500 each and tenable at the various colleges and universities of Ontario, including Carleton University. They are awarded to students of good character, whose health is satisfactory, who meet the required academic standing, and who, without financial assistance, could not continue their formal education.

Candidates must be residents of Ontario and have obtained at least third-class standing in the examinations of the year prior to that for which the loan would be used.

Journalism Loan Fund. Reserved for students in the course leading to the degree of Bachelor of Journalism. Founded by The Canadian Women's Press Club, Ottawa Branch. Other donors: Rielle Thomson, Kenneth Wilson, Blair Fraser, Canadian Pulp and Paper Association, Bruce Hutchison, F. P. Galbraith, Serrell Hillman, T. W. L. MacDermot. Established 1948.

Commerce Loan Fund. Preference is given to students in the course leading to the degree of Bachelor of Commerce. Founded in 1949 by the class of Commerce '49. Other donors: Class of Commerce '50.

Laurentian Chapter (I.O.D.E.) Small Loan Fund

The sum of \$200 has been made available to assist in providing small emergency short-term loans to students in need. Donor: Laurentian Chapter I.O.D.E. Established 1950; revised 1959.

Arrangements may be made, on occasion, for assistance from funds administered by other organizations, among which are:

Veterans' University Loan Fund. Administered for the Department of Veterans Affairs to aid student veterans who are in receipt of allowances but need assistance to meet emergency expenses.

Royal Canadian Naval Benevolent Fund. The purpose of the Fund is to relieve distress and promote the well-being of naval personnel and their dependents both while serving and after discharge, except:

- (a) Former permanent force personnel with less than one year's service unless they had service during World War II.
- (b) Members of the Royal Canadian Navy (Reserve) with less than three year's service unless they had service during World War II.

Army Benevolent Fund. This fund exists to provide financial assistance to Army veterans in need. A student veteran may be considered for such assistance, however, only when he has received the maximum assistance for which he is eligible from the Veterans' University Loan Fund or when the Army Benevolent Fund Committee agrees that it would not be in the best interests of the veteran's welfare to request him to undertake the responsibility of the repayment of a loan.

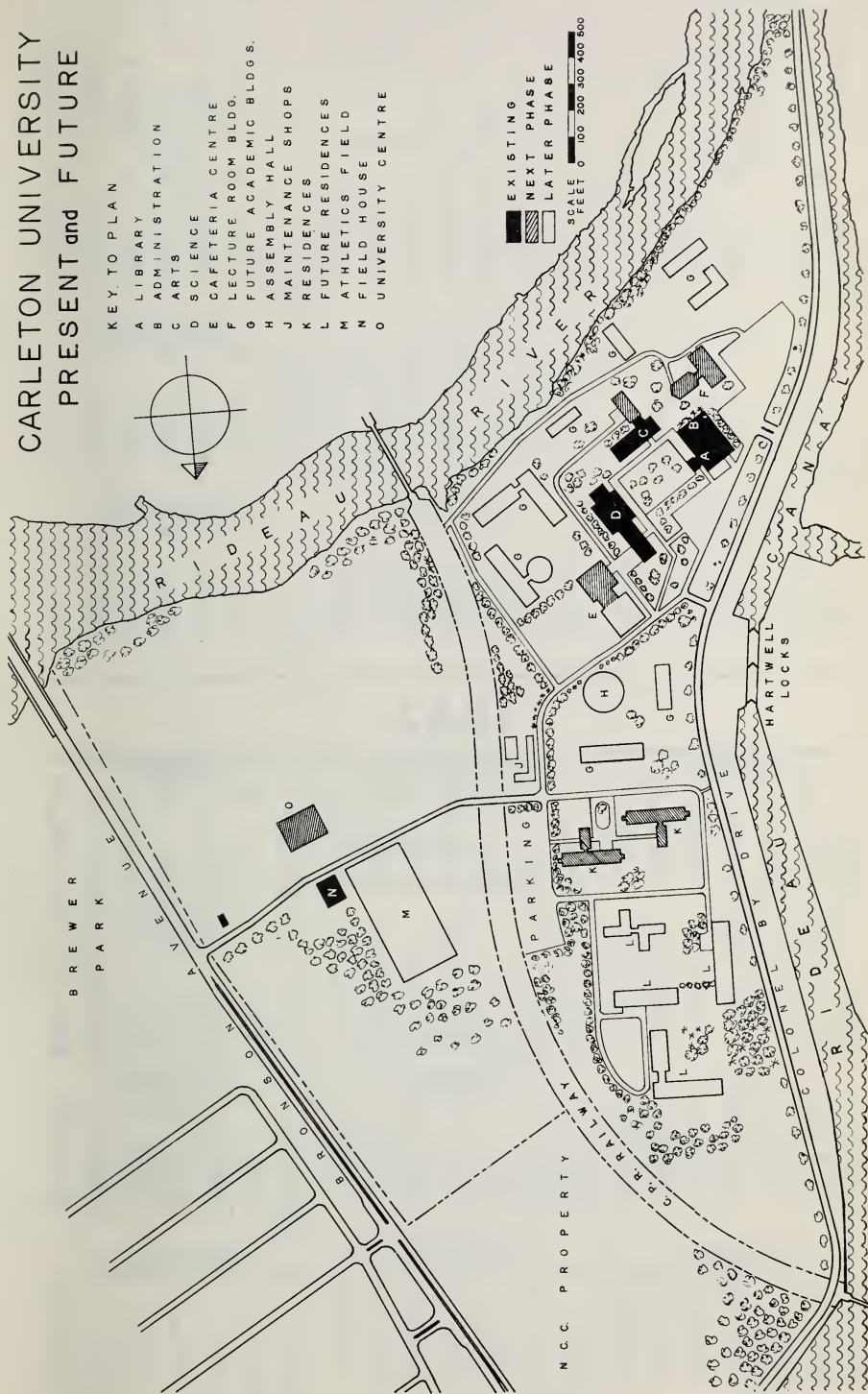
R.C.A.F. Benevolent Fund (*University Loan Fund*). This fund was planned to assist in the education of discharged members of the R.C.A.F., their children and children of deceased personnel. Sums up to a normal maximum of \$300 may be borrowed and are repayable out of the following summer's earnings or after graduation, as preferred.

Harry F. Bennett Educational Fund. Administered by the Engineering Institute of Canada, this fund is available to provide financial assistance to deserving students who have successfully completed their first year in engineering.

P.E.O. Sisterhood Educational Fund. On recommendation by a local chapter of P.E.O., loans may be made for educational purposes to women students who have completed successfully at least one academic year of university studies. Loans shall not exceed \$500 for one year of study or \$1,000 for two or more years. In the case of loans for graduate students or seniors completing a four-year course, the maximum amount may be available for one year of study.

Further information regarding the various sources of financial aid may be had from the Registrar.

CARLETON UNIVERSITY
PRESENT and FUTURE



096652

1961

JANUARY							FEBRUARY							MARCH							
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30	31																				
OCTOBER							NOVEMBER							DECEMBER							
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	
1	2	3	4	5	6	7				1	2	3	4						1	2	
8	9	10	11	12	13	14	5	6	7	8	9	10	11	3	4	5	6	7	8	9	
15	16	17	18	19	20	21	12	13	14	15	16	17	18	10	11	12	13	14	15	16	
22	23	24	25	26	27	28	19	20	21	22	23	24	25	17	18	19	20	21	22	23	
29	30	31					26	27	28	29	30			24	25	26	27	28	29	30	
														31							

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JANUARY							FEBRUARY							MARCH						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6					1	2	3					1	2	3
7	8	9	10	11	12	13	4	5	6	7	8	9	10	4	5	6	7	8	9	10
14	15	16	17	18	19	20	11	12	13	14	15	16	17	11	12	13	14	15	16	17
21	22	23	24	25	26	27	18	19	20	21	22	23	24	18	19	20	21	22	23	24
28	29	30	31				25	26	27	28				25	26	27	28	29	30	31
APRIL							MAY							JUNE						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7			1	2	3	4	5						1	2
8	9	10	11	12	13	14	6	7	8	9	10	11	12	3	4	5	6	7	8	9
15	16	17	18	19	20	21	13	14	15	16	17	18	19	10	11	12	13	14	15	16
22	23	24	25	26	27	28	20	21	22	23	24	25	26	17	18	19	20	21	22	23
29	30						27	28	29	30	31			24	25	26	27	28	29	30
JULY							AUGUST							SEPTEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7				1	2	3	4						1	
8	9	10	11	12	13	14	5	6	7	8	9	10	11	2	3	4	5	6	7	8
15	16	17	18	19	20	21	12	13	14	15	16	17	18	9	10	11	12	13	14	15
22	23	24	25	26	27	28	19	20	21	22	23	24	25	16	17	18	19	20	21	22
29	30	31					26	27	28	29	30	31		23	24	25	26	27	28	29
														30						
OCTOBER							NOVEMBER							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6					1	2	3						1	
7	8	9	10	11	12	13	4	5	6	7	8	9	10	2	3	4	5	6	7	8
14	15	16	17	18	19	20	11	12	13	14	15	16	17	9	10	11	12	13	14	15
21	22	23	24	25	26	27	18	19	20	21	22	23	24	16	17	18	19	20	21	22
28	29	30	31				25	26	27	28	29	30		23	24	25	26	27	28	29
														30	31					

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LIBRARY HOURS

WINTER SESSION

September 5 to May 9

Monday to Friday8.45 a.m. to 10.15 p.m.

Saturday9.45 a.m. to 4.45 p.m.

SUMMER SESSION

May 29 to August 17

Monday to Friday8.30 a.m. to 4.00 p.m.

Monday, Wednesday, and Thursday6.30 p.m. to 10.00 p.m.

SaturdayClosed all day

Between sessions the library is open in the daytime only.

